

## IBM set for its ATM coming-out party

BY MICHAEL COONEY

Raleigh, N.C.

IBM this week will flesh out its ATM strategy with the announcement of Nways BroadBand Switch, a family of Asynchronous Transfer Mode products that it is banking on to revitalize its networking business.

The Nways line will include five wide-area network switches, a wiring concentrator and new software that will tie IBM's 8260 ATM hub to the mainframe.

"This is the single most important network announcement IBM has made since the introduction of SNA 20 years ago," said Howard Anderson, managing director of The Yankee Group, a research firm in Boston.

The Nways switches, Models 200, 300, 500, 700 and 800, represent IBM's first family of scalable ATM devices. Models 200 and 300 are customer premises equipment switches and have a capac-

ity of 200M and 2.1G bit/sec, respectively, according to Anderson. Both will ship this year. The Model 200 will be priced at \$20,000, and the Model 300 will cost between \$40,000 and \$400,000, depending on configuration.

The Nways Models 500, 700 and 800 will be targeted at telephone companies and support switching capacities of 4.2G, 25.6G and 51.2G bit/sec, respectively. These boxes will ship mid- to late 1995. Prices for the Model 500 will run the same as the Model 300 — between \$40,000 and \$400,000 — while the Model 700 will cost between \$300,000 and \$1 million. Pricing was unavailable for the Model 800.

The switches will support a variety of interfaces from X.25 and High-Level Data Link Control to Integrated Services Digital Network, High Speed Serial Interface and frame relay. They will also support continuous bit rate inter-

See Party, page 72

**"IBM cannot make ATM the son of Token Ring."**

— Todd Dages

### PRODUCT REVIEW

## AppWhere?

*Poised, but not complete*

A test drive through Novell's AppWare finds a suitable level of functionality for developers to get started, even though a pivotal object manager is missing.



Page 55.

## Bell Atlantic to tariff ATM

BY DAVID ROHDE

Washington, D.C.

Betting on the enormous bandwidth appetite of the Department of Defense, Bell Atlantic Corp. will soon become the first regional Bell holding company to tariff a public Asynchronous Transfer Mode (ATM) service.

Bell Atlantic officials said they will file a tariff with the Federal Communications Commission as soon as this

week outlining terms under which government users can buy ATM service, effectively putting a stake in the ground for other carriers to follow on ATM pricing.

Pacific Bell earlier this year set out ATM prices for its pretariff market trial, but it has yet to file a general tariff (NW, Jan. 10, page 9). Users participating in that trial pay for the service largely, if

See Bell Atlantic, page 74

### MICROSOFT

## Mail server gets mixed reviews

BY KEVIN FOGARTY

Seattle

Microsoft Corp. drew cheers and jeers last week at the formal announcement of its long-awaited next-generation electronic mail product.

Promises of new features had users

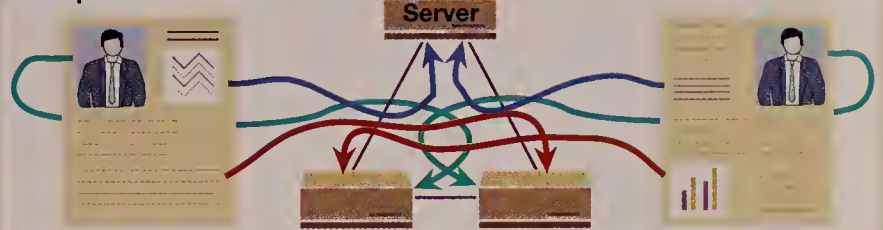
applauding, while demonstration failures showed why Microsoft will put the Microsoft Exchange Server through a total of four rounds of beta testing before releasing it sometime next year.

Users have been looking forward to Microsoft's native Simple Mail Transfer Protocol support, X.400 message transfer, integrated groupware and work flow features since last year, when it began touting the product as a possible competitor to Lotus Development Corp.'s Notes groupware.

Some users have made  
See Reviews, page 73

### How OLE can drag down a network

Compound document



Compound documents can be created using OLE's dynamic linking technology to capture data, graphics and text from across a network. But without careful planning, OLE traffic can get out of hand and bog networks down.

GRAPHIC BY TERRI MITCHELL

## Microsoft's OLE can be network Trojan horse

BY KEVIN FOGARTY  
AND ADAM GAFFIN

Redmond, Wash.

The same features that make Microsoft Corp.'s Object Linking and Embedding (OLE) technology easy to use can also wreak havoc on networks.

OLE is a so-called dynamic-linking technology that lets desktop application users link related documents and applications into a compound document. But as OLE-compatible applications proliferate, end users working with OLE objects may unwittingly overburden corporate nets by launching applications and calling up big files on machines across the enterprise.

Thomas Nolle, president of CIMI Corp., a consulting firm in Voorhees, N.J., said one of his clients, whom he declined to identify, recently ran into just such problems.

Network managers started getting complaints about performance hits and could not figure out why, even after quizzing employees about whether they were doing anything unusual, Nolle said.

Ultimately, they found that the network was loaded with a large number of files with OLE links and employees accessing these linked files were causing the problems.

See Trojan horse, page 75

## Of doctors, kids and ATM

BY SKIP MACASKILL

Baltimore

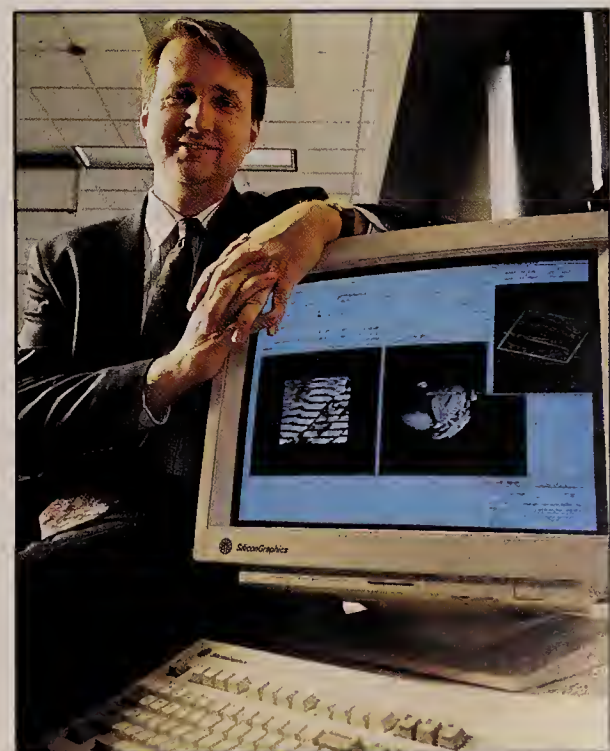
For children with skull deformities or fractures that require reconstructive surgery, Asynchronous Transfer Mode (ATM) may be just what the doctor ordered.

So hope researchers at the Johns Hopkins University (JHU) School of Medicine and the University of Maryland Medical Center (UMMC) who are using the emerging technology to build an advanced medical imaging and archiving system.

Using 2010 ATM switches from LightStream Corp., the two facilities are building a high-speed, private backbone that will allow CAT scans and MRIs taken at UMMC to be forwarded to JHU where they will be archived for research.

"Our goal is to develop an image database that can help physicians predict the long-term outcome of surgery"

See Doctors, page 74



Carey Kriz of Johns Hopkins University







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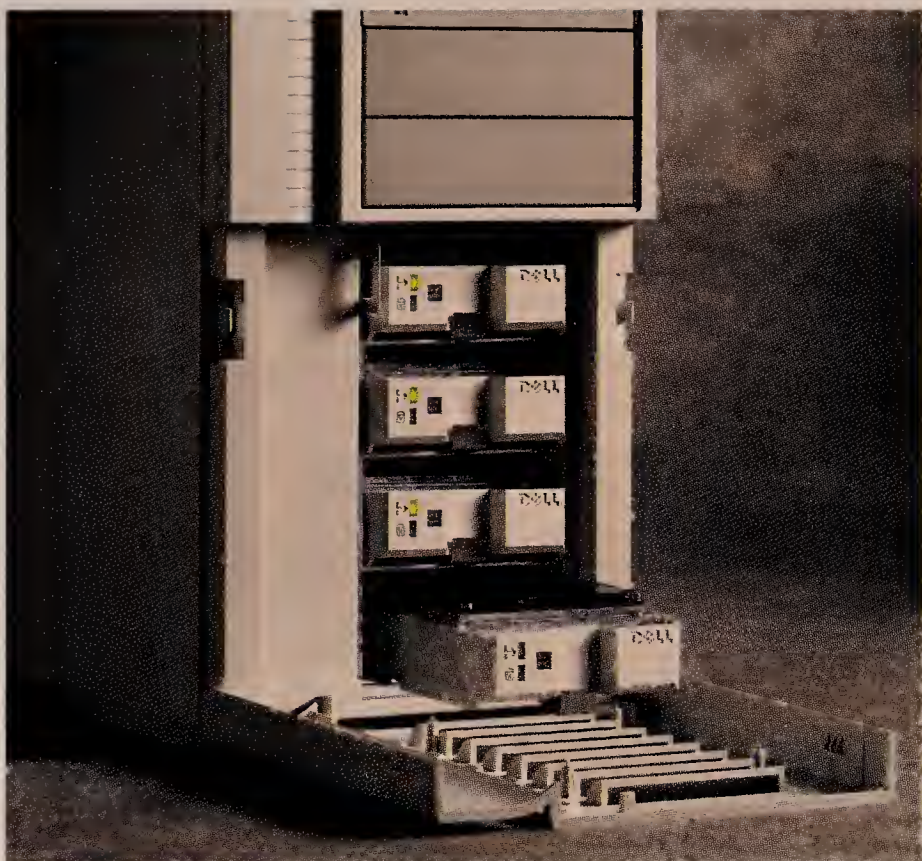
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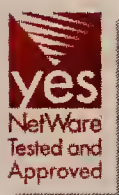
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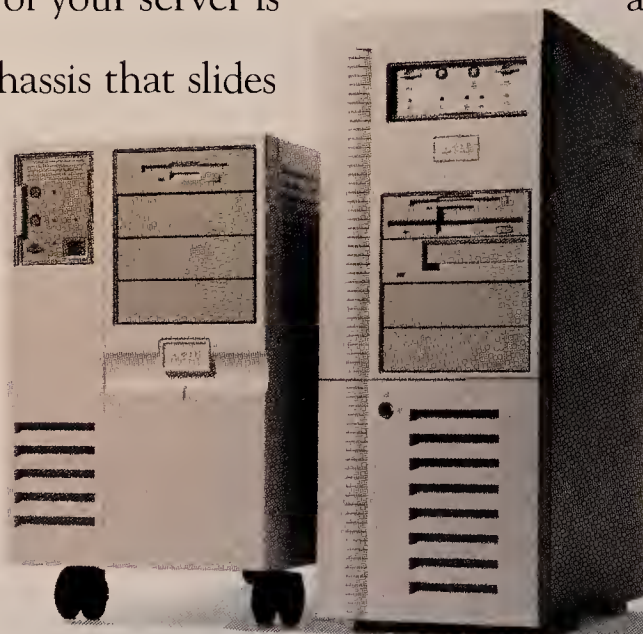
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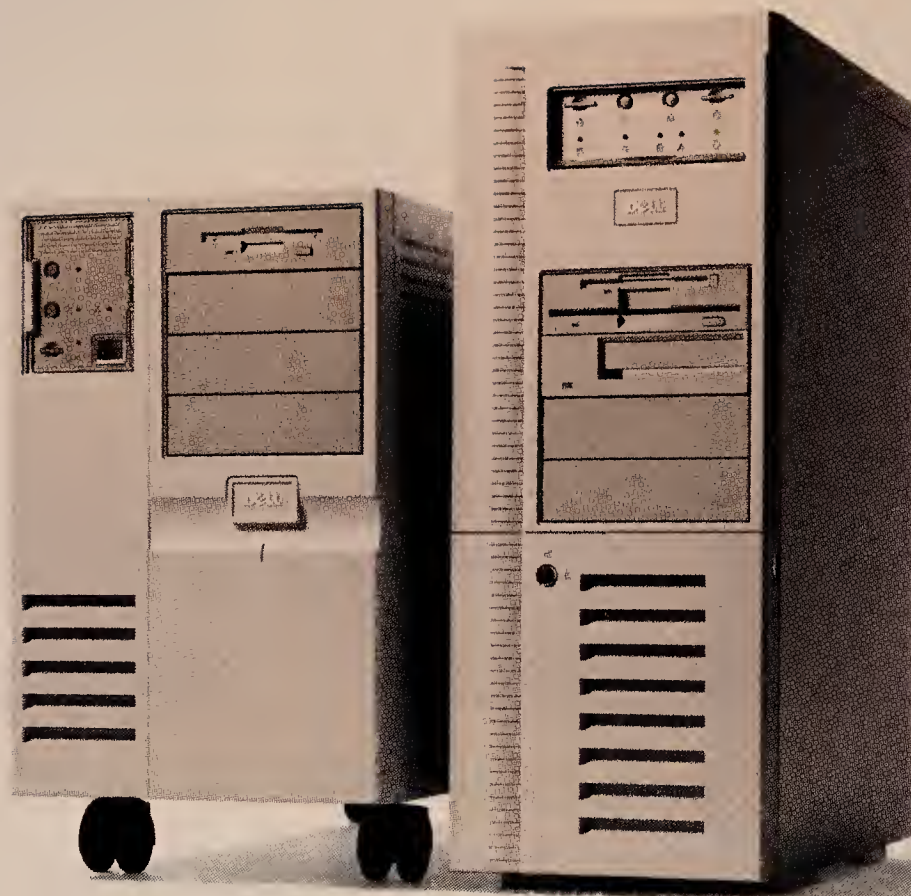
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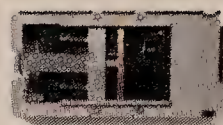
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# Briefs

**Lost in the mail.** MCI and the soon-to-be-renamed WordPerfect Corp. have put plans for a WordPerfect-based messaging hub on hold. Originally scheduled to launch this month, the service is now not expected to go into pilot for at least a couple more months.

**FCC is insecure.** In its investigative report to Congress on the Federal Communications Commission, the FCC's Office of the Inspector General said the commission's new \$11 million local-area network lacks adequate security and backup controls and that a network failure could paralyze the FCC. The report notes the FCC failed to prepare a computer security plan or risk analysis assessment of the LANs prior to installation. The report orders FCC staff to take corrective action.

**AT&T has a vision.** As expected, AT&T this week will announce a framework for managing its products and services from Hewlett-Packard Co.'s OpenView platform (NW, June 20, page 1). Called OneVision, the framework specifies common database, application and user interface guidelines for integrated, end-to-end management of networks and systems. OneVision also includes NetLabs, Inc.'s NerveCenter event management technology and AT&T's BaseWorX application development and run-time environment. A Unix version is scheduled to ship in the fourth quarter, and a Windows NT version is expected in the second half of 1995; both are intended for AT&T hardware.

**Lawyers succumb.** Canter & Siegel, the Arizona immigration lawyers that have come under fire for violating Internet advertising etiquette, have agreed to stop barraging the net, at least via Performance Systems International, Inc., an Internet provider in Herndon, Va. The law firm recently used a PSI connection to post messages in hundreds of conferences about their services. After watching its network performance degrade under the onslaught of several large "mail bombs" sent by irate Internetters, PSI announced last week that Canter & Siegel had agreed to limit their messages to appropriate conferences.

**IBM goes SMP.** IBM this week is expected to release OS/2 for SMP, a symmetric multiprocessing version of its OS/2 operating system that has been anticipated for some time. Eight other vendors will be on hand to announce that they will bundle OS/2 for SMP with their multiprocessing servers. They include Advanced Logic Research, AST Research, Inc., Compaq Computer Corp., Tricord and IBM's own PC Co.

**Adding to the Worx.** AT&T last week introduced an 800-service component to its recently announced WorldWorx Solutions desktop multimedia offering (NW, June 20, page 6). AT&T WorldWorx 800 will reportedly allow users with desktop personal computers to dial a toll-free number and exchange multimedia data or conduct videoconferences with the host site. For instance, consumers could call a catalog retailer and download graphic images of merchandise to their PCs, the company said. However, callers will require at least a 56K bit/sec or Integrated Services Digital Network line.

**Real-time groupware.** Chiat/Day, Inc., a New York advertising firm, is getting into the groupware market. It has formed a joint venture with Cambridge, Mass., start-up Art Technology Group to develop a real-time "virtual office" application. The software, code-named Oxygen, works on a room metaphor, under which users will be able to share files, hold white board conferences and quickly establish telephone connections.

**It happens.** The eastern part of Aspen, Colo., lost telephone service last week from Monday at 11 a.m. till Wednesday night when a backhoe at a construction project sliced through a 4200-pair copper cable. While US WEST's policy is not to reimburse for lost business, a spokesman said the company will credit customer bills for the number of service hours lost.

## Contacts

ADDRESS: Network World, 161 Worcester Rd., Framingham, MA 01701. PHONE: (508) 875-6400; FAX: (508) 820-3467; INTERNET: network@world.std.com.; BBS: Interact with other readers: download free software, submit letters to the editor, leave news tips, change of address requests or hunt for jobs by using your IBM, Apple or other computer to dial into the BBS at speeds up to 9.6K bit/sec by dialing (508) 620-1178 or (508) 620-1160. READER ADVOCACY FORCE (R.A.F.) HOTLINE: Contact us with story tips about pressing user issues, (800) 622-1108, Ext. 487; NETWORK HELP DESK: Contact Dana Thorat via any of the above means.

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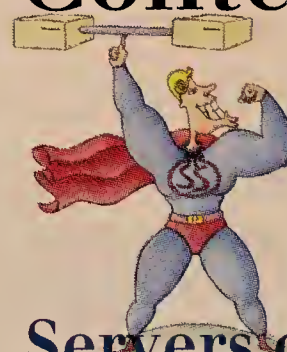
## ENTERPRISE INTERNETS

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# Servers on steroids

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## Network HELP desk

Network World tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Dana Thorat at (800) 622-1108, via fax at (508) 820-3467, via the Internet at djt@world.std.com or via CompuServe at 73244,2673.

**I am thinking about getting a Serial Line Internet Protocol (SLIP)/Point-to-Point Protocol (PPP) connection to the Internet for my company. Do any providers in the New York area support 28.8K bit/sec connections at this time?**

J.W., New York

Adam Gaffin, a senior writer at *Network World*, replies:

At least three Internet public-access systems in New York City provide SLIP and PPP connections; however, only one at this time supports 28.8K bit/sec connections.

Public Access Networks Corp. (Panix Public Access Internet and Unix) based in Manhattan, N.Y., offers two types of SLIP/PPP access. Dedicated 24-hour access across a 28.8K bit/sec connection will cost \$750 to set up and \$375 a month. This connection lets your site stay permanently con-

nected to the Internet (if, for example, you wanted to offer an information service to Internet users) as well as create your own domain (which would allow for multiple Electronic mailboxes). Panix uses Hayes V.FC modems for its 28.8K bit/sec service.

For more information call, Panix at (212) 787-6160 or if you already have Internet access, finger info.ix.com.

Echo Communications Group, Inc. offers unlimited 14.4K bit/sec SLIP/PPP access for \$200 a month plus a \$500 installation fee. For more information, call (212) 255-3839.

Both Panix and Echo Communications offer lower-cost "personal" SLIP/PPP access for individual accounts not meant to remain connected to the Internet at all times.

A third provider, The Pipeline Network, also offers such access with a unique graphical interface for Windows users. For more information on The Pipeline, call (212) 267-3636.

**Can you identify antivirus software for the Unix/SunOS platform?**

Jon Kienlen, Boise, Idaho  
See Help desk, page 57



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# NTI to back NetWare telephony-based services

BY DAVID ROHDE

Seattle

Northern Telecom, Inc. (NTI) this week will announce support for Novell, Inc.'s computer-telephone integration (CTI) strategy and a joint partnership with Intel Corp. to forge a link between the Novell and Microsoft Corp. CTI platforms.

NTI is the last major private branch exchange vendor to announce support for NetWare Telephony Services but the first to bridge the gap between the NetWare product and Microsoft's Windows Telephony API, known variously as Windows Telephony or TAPI.

NetWare Telephony Services offers applications that leverage data housed in local-area networks. It has previously drawn support from AT&T, Rolm, NEC America, Inc., Fujitsu Business Communications Systems and other PBX makers.

TAPI is an interface that allows application programs in desktop machines to control telephony functions.

Potential uses include point-and-click setup of conference calls and customer service applications where customer data arrives at a user's workstation from LAN servers along with telephone calls routed from the PBX.

Adding NTI's huge installed base — particularly its 6,000 call centers — to the pot promises to encourage more application development activity by independent software vendors for both platforms.

NetWare Telephony Services will be available for all models of the Meridian 1, said Bill Connor, NTI's vice president of

global enterprise networks. To implement it requires only a software upgrade to the existing Meridian Link computer-telephone integration driver.

"Our competitors would put a black box between the server and the PBX," Connor said.

At the same time, the price of the Meridian Link itself is being reduced to as low as \$2,500, following recent moves by AT&T and Rolm to cut the price of their CTI products.

The link Intel and NTI have developed between NetWare Telephony Services and TAPI, dubbed TMAP, is significant because it will let Windows client machines work with NetWare servers for telephony applications, said Gary Andresen, a principal analyst with Dataquest, Inc.

"Northern Telecom is [saying] that both of them have value and they're going to bring them together," said Andresen, who also applauded the drop in the price of Meridian

See **Telephony**, page 74

**NTI is the last major PBX vendor to announce support for NetWare Telephony Services.**

# Vocal users get the best deals, lowest phone rates

BY DAVID ROHDE

Washington, D.C.

If you're paying more than 15 cents a minute for long-distance voice or data service, you may be missing the boat.

A bevy of options — such as cut-rate reseller offerings and flat-rate deals from second-tier carriers — are now available to even the smallest of customers.

Even AT&T is offering special deals with eye-popping discounts of 35% or more to firms with usage as trivial as \$200 a month.

But there's a catch, observers counsel: You gotta speak up. If you sit mum, the Big Three will just continue to raise your rates. The mere act of threatening to go elsewhere often is enough to save you a bundle.

"Because second-tier carriers are pricing long distance right around 15 cents, AT&T is coming down to that level even for smaller users," according to Hank Levine, a principal with the Levine, Lagapa and Block law firm here. "All you have to do is tell AT&T you're talking to one of [the second-tier carriers], and they'll negotiate."

Brian Thompson, chairman and chief executive officer of LCI International, Inc., in McLean, Va., sees this all the time. "MCI and Sprint basically have told their sales forces to beat any price," said Thompson, a former MCI executive. "The

fact AT&T is doing this is no great surprise."

Sometimes LCI is not even the low bidder, Thompson said. That's fine with him, since he does not want LCI to be seen as competing only on price.

Recent marketing pieces by LCI and other second-tier long-distance carriers have needled the Big Three for their jumble of plans and tendency to raise rates in lock-step. LCI, for example, uses the slogan "Simple, Fair, and Inexpensive" in national cable

television ads and elsewhere to promote such items as its All-America Plan and Integrity.

By contrast, under LCI's All-America Plan, all calls within the continental U.S. cost 17 cents per minute during the day, 15 cents in the evening, and 12 cents at night and during weekends, regardless of distance.

For businesses that install a dedicated access line to LCI's point of presence, all outbound calls under LCI's Integrity cost 11.9 cents per minute during the day and 9.9 cents at all other times.

Some firms have also turned for savings to resellers, which are marketing companies that resell services from big carriers.

By going to prominent resellers such as Hertz Technologies, Tulsa Corp., a subsidiary of rental car giant Hertz Corp., users can frequently specify which underlying carrier they want to use.

## Nine ways to beat tariffs

With dramatic changes in contract tariff minimums and a broadening of the reseller market, almost all businesses can take advantage of some or all of the following tips:

- 1 Negotiate a contract tariff or bulk service arrangement.**
- 2 Piggyback on someone else's Tariff 12 or contract deal.**
- 3 Use an AT&T, MCI or Sprint switchless reseller.**
- 4 Grab a flat-rate plan from a second-tier carrier.**
- 5 Take advantage of limited-time promotions.**
- 6 Use nontariffed, enhanced services, such as interstate frame relay.**
- 7 Avoid tariff-linked rates in third-party chargeback situations like hotel rooms.**
- 8 Include special travel card arrangements in contract and reseller deals.**
- 9 Make sure each carrier knows you are talking to the others.**

Hertz Technologies offers a choice of programs using the networks of AT&T, MCI Communications Corp. or WilTel, said Larry Gardner, a Hertz Technologies vice president.

Although MCI has not always dealt with resellers, last month it reversed its policy (NW, June 20, page 35).

And while AT&T has had a love-hate relationship with resellers, Sprint Corp. is encouraging them by offering deals under its Diversified Brands umbrella.

Resellers can resell capacity not just to small companies, but to companies that spend up to \$10,000 or \$20,000 a month in usage, said Kevin Brauer, Sprint's president of sales for Sprint Business.

Responding to a common complaint by resellers and their customers that they are treated as second-class citizens, Sprint, LCI and others have established special provisioning programs. "We have account teams and support teams [for resellers]," Bauer said. "That is their only job."

## NEGOTIATE SAVINGS

In order to take advantage of any of these cost saving options, users have to play the carriers against one another, the experts claim.

That used to be possible only for those who spent more than \$20,000 a month, since no AT&T contract tariffs were written for levels below this and most applied to users with \$100,000 to \$1 million or more of usage.

With items such as AT&T's Contract Tariff No. 1094, effective April 22, users with only \$200 a month usage can get 37% off the regular rates for AT&T's CustomNet service, which offers both outbound and inbound service without requiring a dedicated access line.

Using the contract tariff, service only costs 16.38 cents per minute, instead of 26 cents a minute under the regular tariff.

And that's just for starters. Additional discounts are available for users that bump up their usage to various levels ranging up to \$14,000, so even users that have significant monthly costs can take advantage of this

See **Lower rates**, page 74

# Beta users give Oracle server a stamp of approval

BY BARB COLE

Redwood Shores, Calif.

Oracle Corp.'s Oracle7 Release 7.1, which was officially announced last week, is giving beta users a downsizing boost by making it easier for them to run big databases in LAN environments.

Early adopters said the parallel processing capabilities in Release 7.1, coupled with symmetric multiprocessing (SMP) and massively parallel computers, are enabling them to move databases once handled by mainframes to client/server systems. As a result, many Release 7.1 customers are overhauling their networks to give end users improved access to data.

Parallel processing enables database tasks, such as joins, queries and indexing, to be parceled out across multiple processors for improved performance.

"We're looking at changing our net topology because we're able to move relevant data closer to the end users with Release 7.1," said Ronan Miles, technical architect at British Telecom International in Cardiff, Wales. Miles is moving an 80T-byte sales and marketing database from a mainframe to Sequent Computer Systems, Inc.'s Symmetry 5000 SMP computers running Release 7.1.

Miles had tried to move data closer to end users with local servers running Oracle7 Release 7.0, but "queries simply took too long." Miles will adopt a three-tiered architecture that includes a mainframe, multiple SMP servers and workstations.

"Parallel processing lets end users do queries that weren't possible with previous technology," said Jesus Rodriguez, chief architect at Fingerhut Companies, Inc. in Minnetonka, Minn.

Customers said the performance of 7.1 is impressive. "We're seeing improvements of 20 to 50 times on a [Sun Microsystems Computer Corp.] Sun SPARC 2000," he said. Fingerhut, a mail-order catalog firm, is downsizing a 380G-byte customer contact database.

In addition to parallel processing, Release 7.1 has improved replication features. Systems administrators may update data at a single location, from site to site or across the entire system through Symmetric Replication (NW, June 20, page 6).

Beta testers warned that while giving end users access to data is good, it is likely to increase demands on the net. "What's going to happen when the marketing people realize they can slice and dice data they didn't have access to before? The demands on the network will go way up," said Richard Skrinde, president of Strategic Solutions in Alameda, Calif.

Additionally, widespread automatic replication can overload a net. "If you're using Symmetric Replication, you need to 'size' it correctly or your network won't be able to handle it," Rodriguez said.

Also new to Release 7.1 is Oracle Server Manager, a client-based server administration tool that lets systems administrators manage multiple Oracle servers from a single location. Server Manager, which provides disk utilization features and a replication catalog, runs on Microsoft Windows, Macintosh and Unix.

Release 7.1 starts at \$5,440 for an eight-user license. It comes on over 10 multiprocessor platforms.

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## Comments?

See "Contacts" box on page 2.



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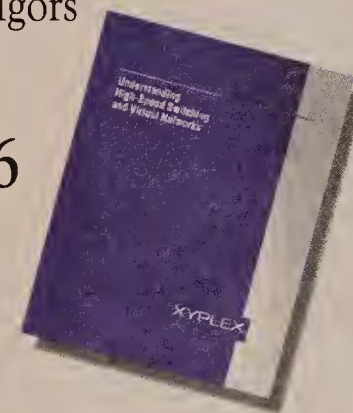
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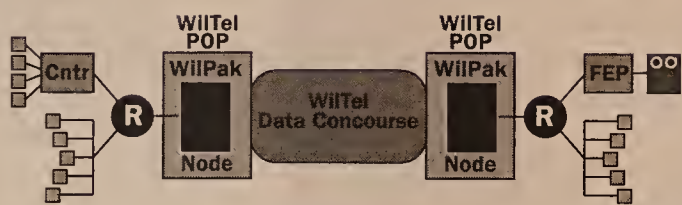


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## ROUTING

# New Cisco software saves TCP/IP links

BY JIM DUFFY

San Jose, Calif.

Cisco Systems, Inc. last week unveiled a software enhancement for its routers that is designed to keep TCP/IP links intact when a router fails.

Included as a standard component of Cisco's Internetwork Operating System (IOS), the Hot Standby Router Protocol (HSRP) lets one Internet Protocol router take over automatically for a disabled router. That could free users from having to reconfigure Transmission Control Protocol/IP hosts to work with a backup device and save them from buying a high-end router just for redundancy features.

"In high-availability environments, people will set up more than one router on a LAN," said Paulina Knibbe, a Cisco product manager. "But a host typically picks a router and continues to use it. If that router goes away, the host is basically stuck until someone changes the configuration."

HSRP attacks the problem from a different angle.

By allowing multiple routers on a local-area network to monitor each other, one router can assume the address of another that has been disabled, and the host never detects the change, she said.

Analysts said HSRP will save users from buying high-end routers just for the redundancy capabilities.

"This would be important where you don't have a high-end router that has [redundancy]," said Jay Batson, an analyst at Forrester Research, Inc., in Cambridge, Mass. "Rather than buying a Cisco AGS or 7000 or a Wellfleet backbone node, you can put two \$2,500 routers in. It saves you some money if you absolutely positively have to have uptime."

Cisco users were cautious about HSRP. "You're keeping routing tables, connections and data in both routers and both memories, and they are somehow in synch," said Imran Bashir, manager of systems integration at Unitel Communications, Inc. in Toronto. "It sounds like a reasonably good feature, but how can it be done?"

HSRP will work on Ethernet, token-ring and Fiber Distributed Data Interface LANs, and runs in conjunction with common routing protocols.

Existing Cisco routers covered by the company's software maintenance agreement can be upgraded to IOS with HSRP free of charge, Cisco said.

©Cisco: (408) 526-4000.

**"In high-availability environments, people will set up more than one router on a LAN."**

# 3Com enters big league game with router release

BY SKIP MACASKILL

Santa Clara, Calif.

3Com Corp. this week will introduce a high-end version of its NetBuilder II router that will enable the company to compete more directly with the likes of Cisco Systems, Inc. and Wellfleet Communications, Inc.

The revamped NetBuilder II 8-Slot Extended Chassis supports a new multiprocessor architecture that delivers higher performance, more ports and better reliability than its predecessor.

Although it uses the same backplane, software and central processor as the existing NetBuilder II, the Extended Chassis is larger and comes with intelligent modules that can make their own routing decisions.

The new router, which is targeted at environments with a mix of shared and switched local-area network segments, will be interoperable with existing NetBuilder IIs. In fact, customers will be able to use the new modules in current chassis as well as the existing modules in the new chassis.

## THE LEAPFROG

"With the new NetBuilder, 3Com finally has a truly high-end routing platform," said Val Sribar, senior industry analyst at META Group, Inc., a consultancy in Westport, Conn. "In that sense, it's a me-too product since its competitors already have high-end offerings. However, if you are going to roll out a me-too product, it better be accompanied by a leapfrog, and the ability to use routing cards across all the platforms is the leapfrog."

On the surface, the Extended Chassis looks very much like the NetBuilder II in that it uses the same 800M bit/sec CoreBus, the same Communications Engine Controller (CEC) route processor — a Reduced Instruction Set Computing-based Advanced Micro Devices, Inc. (AMD) 29000 chip — and the same routing software.

It supports, however, integrated dual power supplies and fan trays, as well as twice the number of Ethernet networks — 48 to NetBuilder II's 24 — and offers more than three times the performance.

According to Bob Roman, product-line manager for NetBuilder II, a fully loaded Extended Chassis is able to forward 64-byte packets at a rate of 270,000 packet/sec, while the current NetBuilder II tops out at 75,000 packet/sec.

That difference is due to the new MultiProcessing (MP) routing modules. These devices feature the AMD 29000 chip and handle all routing decisions for traffic local to the card.

Unlike the existing NetBuilder II, which uses the centralized CEC to process every packet, packets that enter an MP card in the Extended Chassis can be routed right back out, providing the

address is on a local segment.

Traffic that needs to be routed between modules is passed off to the CEC, although in a future release, MP modules will be able to bypass the CEC completely and interact directly, he said.

## INCREASED DENSITY

The first MP card to roll out next week will be the MP Ethernet 6-Port 10Base-T Module, which offers a 50% increase in port density compared to the existing Ethernet module for the NetBuilder II.

All MP modules are double-wide, meaning they take up two slots in the four- and eight-slot NetBuilder II chassis. The Extended Chassis can support eight of either type of module or a combination of the two.

"This is a hardware announcement, and purchase decisions on routers are not made based on who has the best hardware," said one industry analyst requesting anonymity. "The name of the game is still software, and Cisco will win the majority of accounts no matter who it goes up against."

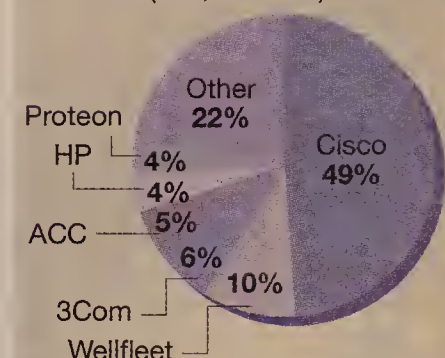
Not true, contended one user who employs both Cisco and 3Com routers.

## A BIG DEAL

"It's a very big deal that I can mix and match existing cards in both the NetBuilder II and Extended Chassis," said Tom Maufer, senior systems engineer at the National Aeronautics and Space Administration's Goddard Space Flight Center in Greenbelt, Md. "Our

## Cisco stays on top

Percent of units shipped  
(145,502 total)



GRAPHIC BY TERRI MITCHELL

# Collaborative alliances headline shows

BY ADAM GAFFIN

WordPerfect Corp. and Lotus Development Corp. are expected to unveil plans for integrating their products more tightly into enterprise nets this week at trade shows in New York and Boston.

At PC Expo in New York, WordPerfect is scheduled to discuss plans to integrate its existing desktop software suite with networking services provided by its Symmetry messaging line and Novell, Inc.'s server technology.

WordPerfect and Novell have said they intend to merge WordPerfect's desktop suite, message store and calendaring capabilities with Novell's back-end message transport and directory services in a series of phases over the next year.

If the paperwork is completed on time, WordPerfect may also announce that its acquisition by Novell

is complete and that its name has been changed to WordPerfect, the Novell Application Group.

Lotus is expected to announce two tools for stitching Notes into enterprise applications. Visual Programmer for Notes will let developers create applications that can access Notes databases through a set of

Open Database Connectivity drivers code-named Notes SQL (see story, page 37).

Meanwhile, Oracle Corp. and Digital Equipment Corp. are scheduled at Database World to announce plans to use Oracle databases and Digital's Alpha AXP platform as a mainframe alternative. The two companies will announce a joint research center to develop migration software for companies seeking to move mainframe applications into client/server nets.

Other announcements at the two shows include:

See Shows, page 72



# Sprint goes global with Internet access

BY JOANIE WEXLER

Washington, D.C.

Sprint Corp. last week became the first carrier to expand its Internet access services internationally in an attempt to give customers consistent, higher speed connections around the globe through one carrier.

The new Global SprintLink service will allow corporate customers in Europe, the U.S. and the Asia-Pacific region to access the worldwide information net at speeds from 128K to 2M bit/sec, compared to typical 64K bit/sec foreign Internet connections today.

"This could be cheaper for customers because usually, access in other countries is more expensive than in the States," said Tony Rutkowski, executive director of the Internet Society, the organization that oversees standardization and development of the Internet. He predicted that many Sprint competitors will launch similar services in the next few months.

Farooq Hussain, Sprint's product manager of Internet services, said one service goal is to enable

customers to get multiple, cost-effective Internet services from one carrier. However, "we're not in a direct head-to-head competitive [pricing] situation with local service providers," he said.

Global SprintLink is being offered over high-speed backbones in London, Paris, Stockholm, Sweden and Tokyo. Hussain said Sprint intends to expand the net significantly during the fourth quarter.

While he would not commit to exact expansion plans, Hussain said Sprint is eyeing "most European capitals and quite a bit of the Asia-Pacific."

Today, high-capacity access links to the Internet are concentrated on the two coasts of the U.S., so many customers route international Internet traffic back to the U.S.

Young & Rubicam, Inc. (Y&R), a New York-based worldwide advertising agency, is hoping that its primary carrier, AT&T, will offer such a service, said Nick Di Iorio, director of networking and telecommunications.

Y&R is building a high-speed link to the Internet from New York via AT&T frame relay links. "Down the road, I might have enough traffic to run my own pipe out of London, then out of Hong Kong. But which provider I go with will depend on cost and the amount of traffic I have," he said. ☐



# IBM adds systems and network mgmt. options

*New and enhanced tools target multiprotocol nets.*

BY MICHAEL COONEY

Raleigh, N.C.

IBM last week continued its summer soiree with the debut of a slew of network and systems management tools for legacy and multiprotocol environments.

The products include a more powerful version of its mainframe work load automation system, new AIX-based software to manage local network devices from NetView/6000 and automate file transfers, and an improved LAN analyzer.

And, as expected, IBM rolled out a new version of its NetView Performance Monitor that supports Novell, Inc. NetWare nets and a more powerful version of its NetView Distribution Manager/6000 software distribution platform (NW, June 13, page 1).

"We are enhancing our solutions that allow users to manage enterprise information [from] a variety of platforms and protocols," said Don Haile, general manager of IBM's Networking Software Division.

## OPC/ESA UPGRADES

Among the announcements was a new version of Operations Planning Control (OPC)/ESA, Release 3, that adds support for RISC System/6000 and Application System/400 platforms, as well as the ability to utilize IBM's Resource Object Data Manager (RODM) to build automation routines.

OPC/ESA software agents are required in the AS/400 and RS/6000 so they can receive commands from OPC/ESA on the mainframe.

OPC/ESA is software that lets users automate, control and plan for such tasks as file transfers and batch processing jobs on MVS

hosts. RODM is IBM's object-oriented management database.

Today, OPC/ESA is limited to controlling 3270 or personal computer devices in a Systems Network Architecture environment, and automation routines must be built from

IBM's summertime menu		
Product	Price	Availability
IBM Job Scheduler for AIX	\$4,000	July 22
OPC/ESA Release 3	\$3,120 to \$64,560*	Sept. 30
AIX SNA Manager/6000	\$15,000 to \$67,500**	July 15
LNM for AIX	\$13,700	Oct. 28
DatagLANce Network Analyzer 1.2 for Ethernet and Token Ring	\$8,000	Oct. 28

\*Depending on processor size.

\*\*Depending on number of devices monitored.

scratch. With RODM support, users can direct OPC/ESA to build routines from system information already in RODM.

Targeted at medium to large IBM installations, the enhanced OPC/ESA will help users manage work being done on distributed AS/400s and RS/6000s from a central location, said Maureen Walsh, IBM advisory programmer.

## AUTOMATING AIX

Also designed to automate work load management in distributed environments is IBM's Job Scheduler for AIX. Job Scheduler runs on an RS/6000 and is the first IBM product that lets users automate, schedule and monitor unattended file transfers and other tasks in a distributed AIX-based net environment.

Job Scheduler can initiate a data transfer

between two RS/6000s and monitor its status. Should the data transfer fail, Job Scheduler automatically restarts the transfer.

IBM also announced a new version of LAN Network Manager (LNM) for AIX. LNM for AIX runs on IBM's NetView/6000 SNMP-based net management platform and lets users monitor and control LAN bridges and other devices on Token-Ring or Ethernet LANs.

In the past, LNM for AIX could only monitor LAN devices — it could not issue commands to them.

"IBM is giving TCP/IP and AIX users the same creature comforts they have enjoyed in SNA environments in the past," said Tom Nolle, president of the CIMI Corp. consultancy in Voorhees, N.J.

Users at CompuServe, Inc. in Columbus, Ohio, agreed.

"Over time we want to be able to do everything from NetView/6000 — from managing hubs and routers to automation," said Jason Comstock, a product specialist with CompuServe.

## WATCHING LAN TRAFFIC

Continuing on the LAN front, IBM announced Version 1.2 of its OS/2-based DatagLANce Network Analyzer for Ethernet and Token-Ring LANs. The Network Analyzer lets users gather real-time LAN statistics and resolve problems on LAN segments.

Version 1.2 adds traffic-generating capabilities, so users can test LAN segment performance. In addition, it adds improved traffic statistics, increased alarm options and improved filtering capabilities, according to Victor Valle, development manager for the Network Analyzer.

It replaces IBM's existing DOS-based Trace and Performance product.

Valle said the multitasking capabilities of OS/2 will make DatagLANce a stronger rival to other offerings in the analyzer market, such as Network General Corp.'s Sniffer.

"Users can monitor multiple LAN segments, debug one segment while capturing data from another — at the same time," Valle said. "DOS-based analyzers can't do that."

©IBM: (919) 301-5928.

## WIRELESS NETWORKING

# RAM Mobile puts merchants on road

BY JOANIE WEXLER

RAM Mobile Data today intends to turn its attention from the wandering worker to the mobile merchant with the announcement of a portable point-of-sale service.

The network operator will announce a package that combines the RAM Mobile wireless transmission service and a new 1-pound, battery-operated radio modem from Ericsson GE that plugs into many common point-of-sale terminals that weigh about 7 pounds.

The goal is to allow businesses to verify credit cards wirelessly when taking their wares on the road — such as at state fairs, sidewalk sales and trade shows — or where electrical outlets and phone jacks are scarce, said Virginia Marshalek, RAM Mobile's director of point-of-sale products.

The RAM Mobile package combines the Ericsson M6000 modem, to be announced today, and RAM Mobile packet radio transmission services with point-of-sale terminals from the likes of VeriFone, Omron Systems of America, Inc. and Dassault Electronique, Inc., Marshalek said.

One retailer expressed interest in the service for use in warehouse sales conducted by his company.

See RAM Mobile, page 75

## Proposed ISDN multimedia applications

- ◆ Medical imaging
- ◆ Distance learning
- ◆ Desktop video
- ◆ Multipoint videoconferencing
- ◆ Remote office: file access and E-mail
- ◆ Multimedia service kiosks for retail and government access
- ◆ Library access: catalog searches and text retrieval
- ◆ Remote maintenance: visual inspection and on-line access to manuals
- ◆ Remote monitoring: security and production lines

# ISDN Forum meets about multimedia

BY BILL BURCH

Gaithersburg, Md.

At its first meeting last week, the ISDN Forum's multimedia applications working group took on one of high tech's eternal debates: Should the group follow de facto standards set by big players, such as Intel Corp., or stick to its charter and formulate vendor-independent standards, even at the risk of being left behind by the market?

Standards for multimedia Integrated Services Digital Network promise to spur the development of carrier services by allowing customer premises equipment to work more smoothly with carriers' lines.

Members of the group, such as Ira Clark, senior member of the technical staff with DGM&S, Inc. in Mt. Laurel, N.J., insist that the best approach is to develop interoperability standards by consensus and not embrace de facto standards such as Intel's specific-

See ISDN Forum, page 75



## CyberSpeak: Voices from the reader network

**What effect will international mega-alliances involving carriers such as MCI and Sprint have on your net plans?**

◆ "On the 23rd of June at 15:57, none. It's way too early to see what will really materialize from these relationships. While there's no question that buying international services piecemeal is a pain in the butt, I'm taking the politician's advice to "watch what we do, not what we say."

Bill Coopman, manager of telecommunications, Deere & Co., Moline, Ill.

◆ "If they're done right, the partner-

ships could have great benefits to clients. AT&T is my main carrier, and I might end up using AT&T for more services because I have been using other carriers for services not available from AT&T. To the extent you have AT&T partnering, they can provide things they've never been able to provide. But the challenge will be for them to manage the conflicts of interest that arise."

Nick Di Iorio, Director of networking and telecommunications, Young & Rubicam, Inc., New York

◆ "We're not sure they're going to have any impact. We're pretty well set in the way we operate overseas, and I'm not sure we'll change just because there's another new alliance. While the idea of having cohesive global service has a theoretical appeal, our everyday lives mean dealing with multiple vendors. So overseas it's really no different than it is in the U.S."

Hal Howard, senior telecommunications analyst, Hoechst-Celanese Corp., Bridgewater, N.J.

**Is Microsoft's recently announced messaging product stable enough to base plans on?**

Responses due by 8 p.m. Thursday, June 30. You'll get a T-shirt if we print your response. Please include your name, title, company and address.

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Circle Reader Service #38



# Microcom is first out with the smallest of the fastest

*Firm readies PCMCIA V.fast modem for shipment this week.*

BY JIM DUFFY

Norwood, Mass.

Microcom, Inc. last week became the first vendor to unveil a credit card-size 28.8K bit/sec modem for portable computers.

The TravelCard Fast 28.8 conforms to the PCMCIA form factor and fits into the PCMCIA slot of any computer. The 28.8K bit/sec modems are the fastest on the market, and Microcom's offering is the smallest of the bunch.

That's welcome news to road warriors who have to download more than just the occasional mail message.

"I had a sales force automation project, and because of the quantity of data that needed to be passed out to the laptops, we didn't feel a 14.4K bit/sec modem would be fast enough," said Brian Ford, manager of network engineering at BellSouth Information Systems in Atlanta, who beta tested the TravelCard. "We felt like the sales guys would be on the telephone way too long. We looked at the cigarette package-size [external] modems, but the number of cables the sales guys would have to deal with made that [unattractive]."

TravelCard is based on Rockwell International Corp.'s V.FastClass chip-set, a 28.8K bit/sec datapump positioned as an interim high-speed solution to the ITU V.34 standard. V.34, which recently attained final draft status and is expected to be formally approved in September, specifies 28.8K bit/sec transmissions over dial-up lines.

Users will have to swap out their existing TravelCards to receive one that is V.34-compliant, Microcom said. The upgrade will cost \$99.

## V.34 in a nutshell

Supports rates of 28.8K bit/sec for synchronous data and 115.2K bit/sec for asynchronous data.

Supports V.42 error correction and V.42bis data compression.

Is in final draft form; expected to be formally approved in September.

Products are expected to be available in October.

Provides a cost-effective alternative to 56K bit/sec switched- or leased circuits.

attached to the parallel port of a personal computer port. Last fall, Microcom introduced a modem that hooks to a PC's parallel port and has shipped 100,000 of them to date, company officials said (NW, Oct. 18, 1993, page 4).

APT is intended to overcome performance bottlenecks inherent in Windows PCs. Because of the overhead of running Windows, data transfer from the serial port buffer to system memory is slowed and data can be overwritten before it is placed in memory. That data must be retransmitted. APT transfers more bits of data at a time, upping performance.

Analysts believe Microcom's TravelCard will be more successful than the firm's external 28.8K bit/sec modem that attaches to a parallel port.

"Users are so used to hooking their printer up to their parallel port that it was sort of unnatural for them [to attach the modem there]," said Lisa Pelgrim, an industry analyst with Dataquest, Inc. in San Jose, Calif. "With the PCMCIA card, that's not an issue."

TravelCard also includes software called Point Enabler, which is intended to ensure that TravelCard works with any PC maker's PCMCIA configuration.

Point Enabler checks compatibility of TravelCard with the Cards and Sockets services of different notebook computers. Cards and Sockets services are interfaces to PC expansion card sockets and software drivers that let the PC communicate with the PCMCIA card.

If the TravelCard is not compatible with the Card and Sockets services of the notebook, Point Enabler performs the Card and Sockets function to foster compatibility. This capability makes

the TravelCard independent of specific Cards and Sockets implementations, company officials said.

The TravelCard will ship this week. It costs \$599.

©Microcom: (617) 551-1000.

skeptical Bill Coopman, manager of telecommunications at international company Deere & Co. in Moline, Ill., and chairman of council for the International Telecommunication Users Group.

"If I am a customer of AT&T, does that mean I'm going to get second-class treatment on my services into Germany or France because I'm not a Sprint customer?" he wondered. "Or will I be snubbed by BT if I don't use MCI?"

Dianne Bernez, an AT&T spokesperson for WorldPartners, noted that Unisource provides facilities in a number of countries in Europe, including France and Germany, as well as Belgium, Denmark, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland and the U.K.

"Unisource is our European arm; it will provide WorldSource services in all these and other European countries, conceivably by the end of this year and in the first quarter of 1995," Bernez said.

The WorldPartners Association is slated to begin rolling out unified virtual network services in the U.S., Japan and Singapore next month. The founding companies are also slated to provide cohesive frame relay and private-line services in their countries later this year (NW, May 30, page 9).

It is not yet clear when more recent sign-ons Telstra OTC Australia and Telecom New Zealand will add WorldPartners-standard services to the fold. ■

# Video interoperability demos take center stage at ITCA

BY ELLEN MESSMER

Dallas

Videoconferencing users can count on interoperability among different standards-based equipment, but setting up video links across multiple carrier domains is still a tricky business.

That was the lesson learned from the interoperability demonstrations staged by videoconferencing vendors AT&T and Sprint Corp. at last week's International TeleConference Association (ITCA) show here. The demos showed that users can interconnect a wide range of systems based on the H.320 standard, but trying to link them across different carrier data nets can still be a nightmare.

In short, a video call made over disparate switched 56K/64K bit/sec digital services or Integrated Services Digital Network Basic Rate Interface (BRI) may or may not get through.

Pressed by the ITCA to explain the Byzantine nature of cross-carrier videoconferencing, AT&T, MCI Communications Corp. and Sprint spent

See Interoperability, page 73

## H.320 video

### Interoperability demo at ITCA featured:

AT&T's multipoint control unit (MCU) and TeleMedia

BT's VC 2300 and V7000

Compression Labs' Radiance

Datapoint Corp.'s MINX NVS

GPT Video Systems, Inc.'s Focus

Mitsubishi Electronics America, Inc.'s Diamond

Panasonic Corp.'s WGV 510

PictureTel Corp.'s PCS LIVE

Sony Corp.'s PCS2000A

VideoServer, Inc.'s MCU

# Desktop video units debut

BY ELLEN MESSMER

New York

PictureTel Corp. and InVision Systems Corp. will announce upgrades to their Windows-based desktop videoconferencing systems at this week's PC Expo here.

PictureTel is adding a data-sharing application to its desktop video system, PCS Live, that will let users share applications and make changes to any Windows-based text or graphics file during a videoconference.

PictureTel has also increased the maximum speed of its system from 128K to 384K bit/sec, which should lend improved picture quality.

InVision, which specializes in software for Windows-based videoconferencing over both local- and wide-area networks, will unveil a version of its product that works with video coder/decoders other than the ActionMedia board developed by Intel Corp. and IBM.

InVision Version 3.0 will be more "codec-independent," according to InVision's President and Chief Executive Officer James Geddes.

It will support the Intel-IBM Smart Video Recorder and ActionMedia II; MediaShare, Inc.'s Mambo and Mambo DT boards; Media Vision, Inc.'s Pro Movie Studio; and other boards from Action Technologies, Inc., Logitech Corp and Xing Technologies, Inc.

Russ Cramer, an analyst at Common Enterprise Communications, Inc. in Wellesley, Mass., is testing InVision software on behalf of NYNEX Corp. Cramer said he has set up videoconferencing sessions between personal computers on Ethernet and token-ring networks over a frame relay network using

Transmission Control Protocol/Internet Protocol.

The PictureTel and InVision Systems announcements will highlight two radically different approaches to Windows-based videoconferencing — one reliant on standards and wide-area synchronous communications, and the other proprietary and focused on the LAN.

PictureTel PCS Live works over links such as Switched Digital Services or Basic Rate Interface Integrated Services Digital Network, and supports the V.35 and RS-449 interfaces.

PCS Live is based on H.320, the international set of videoconferencing standards, so it can share pictures and sound with other H.320-compliant equipment (see story, this page).

"We are firmly behind standards," said Tony Paradiso, director of marketing at PictureTel's personal systems division. "They are mandatory for this market to proliferate."

But start-up InVision, which uses a proprietary method for packetizing video and sound for transmission across a LAN, feels little allegiance to the standards developed under the aegis of the International

Telecommunication Union.

"There are only 15,000 videoconferencing systems out there that use H.320," Geddes said.

"There are 50 million PCs connected to networks. Do they need to be held hostage to H.320?" he asked.

No standard for LAN-based videoconferencing exists.

PictureTel has sold 650 units so far this year, and InVision has sold 550.

©PictureTel: (508) 762-5000; InVision: (703) 506-0098.



PARADISO

# AT&T-led global alliance lands European partner

BY JOANIE WEXLER

Amid this year's whirlwind of massive global telecommunications carrier alliances, WorldPartners' European colleague finally surfaced last week.

After weeks of speculation, Unisource, a joint venture of the Dutch, Swedish and Swiss telecommunications carriers, took the European seat in the WorldPartners Association, which includes founding companies AT&T, Japan's Kokusai Denshin Denwa Company, Ltd. and Singapore Telecom.

The goal of this and similar alliances is to provide multinational customers with consistent services, service levels, prices and billing around the globe.

The Unisource move follows on the heels of Sprint Corp.'s steaming with the French- and German-owned Eunetcom last week, as well as the union of MCI Communications Corp. and BT earlier this year.

While the rhetoric sounds noble, the bottom line benefit of these alliances remains to be proven, said a



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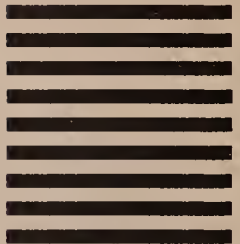
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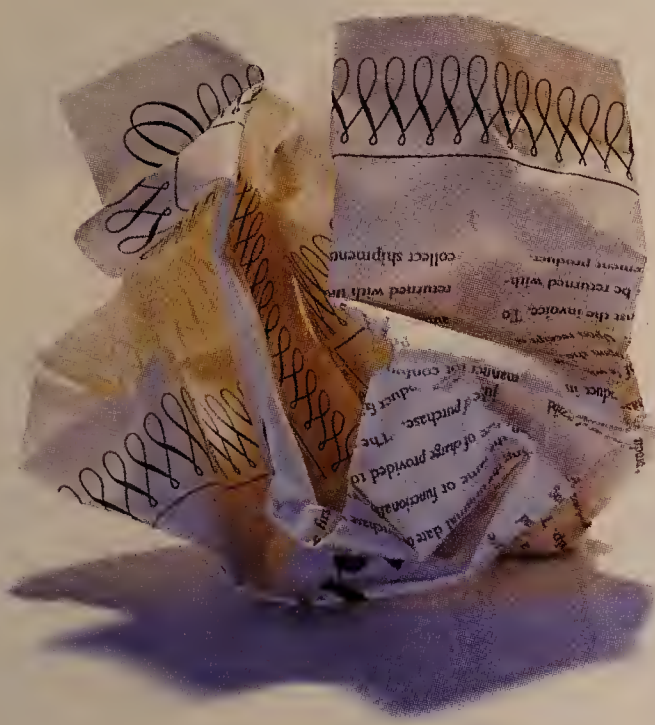
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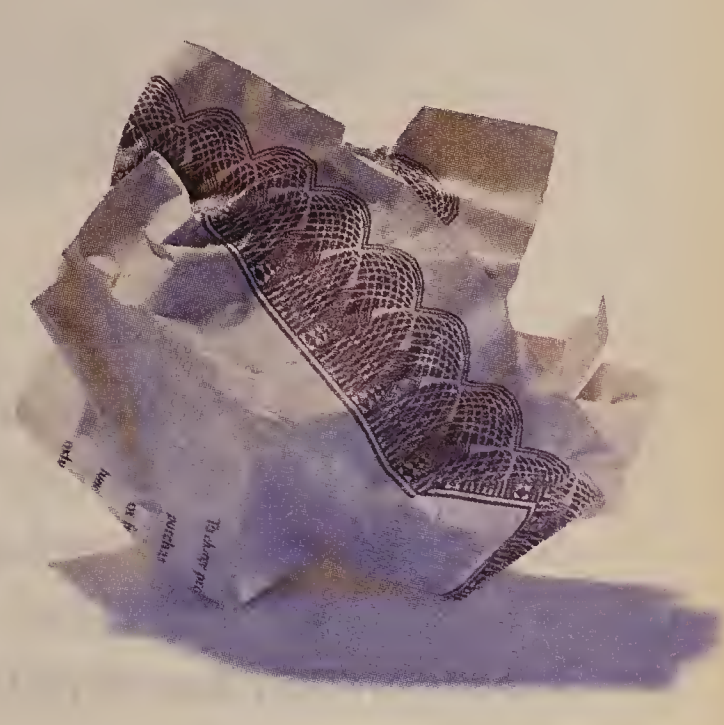
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 City/State/Zip \_\_\_\_\_  
 \_\_\_\_\_  
 Signature \_\_\_\_\_ Date \_\_\_\_\_  
 Business Phone \_\_\_\_\_ Fax \_\_\_\_\_

1 Industry: (check one only)

01. ☐ Manufacturers (other)  
 02. ☐ Finance/Banking  
 03. ☐ Insurance/Real Estate/Legal  
 04. ☐ Healthcare Services  
 05. ☐ Hospitality  
 06. ☐ Retail/Wholesale Trade/Business Services  
 07. ☐ Transportation  
 08. ☐ Utilities  
 09. ☐ Education  
 10. ☐ Process Industries (Mining/Construction/  
     Petroleum Refining/Agriculture/Forestry)  
 11. ☐ Government (Federal/State/Local)  
 12. ☐ Military  
 13. ☐ Aerospace  
 14. ☐ Consultants (Independent)  
 15. ☐ Carriers/Interconnects  
 16. ☐ Manufacturers  
     (Computer/Communications)  
 17. ☐ VAR/VAD/VAN/Systems Houses/  
     Software Houses  
 18. ☐ Distributors,Communications/Computers  
 19. ☐ Other \_\_\_\_\_

2 What is your Job Function? (check one only)

NETWORK IS Management:

1. ☐ Networking Management  
 2. ☐ LAN Management  
 3. ☐ Datacom/Telecom Management  
 4. ☐ IS,IT,MIS,Systems Management  
 5. ☐ Engineering Management

CORPORATE MANAGEMENT:

6. ☐ Corporate Management (CIO,CEO,PRES,VP,  
     DIR,MGR,Financial Management)  
 7. ☐ Consultant (Independent)  
 8. ☐ Other \_\_\_\_\_

3 What is the total number of sites for which you have  
 purchase influence? (check one only)

1. ☐ 100+      3. ☐ 20 - 49      5. ☐ 2 - 9      7. ☐ None  
 2. ☐ 50 - 99      4. ☐ 10 - 19      6. ☐ 1

4 What is your scope and involvement in purchasing  
 decisions for network products & services  
 for your enterprise?

- A. SCOPE**                      **B. INVOLVEMENT**  
 (check one only)                      (check all that apply)

1. ☐ Corporatewide      1. ☐ Recommend/Specify  
 2. ☐ Multienterprise      2. ☐ Approve  
 3. ☐ Departmental      3. ☐ Evaluate  
 4. ☐ None                      4. ☐ Determine the need  
    5. ☐ None

5 Check ALL that apply in columns A and B:

**A:** I am involved in the purchase of the following products/services.

**B:** I plan to purchase the following products/services.

**A**                      **B LOCAL AREA NETWORKS**

- ☐ 01. ☐ Local Area Networks  
☐ 02. ☐ LAN Operating Systems Software  
☐ 03. ☐ LAN Services  
☐ 04. ☐ LAN Storage Devices (optical,tape,disk,etc.)  
☐ 05. ☐ LAN Backup systems (optical,tape,disk,etc.)  
☐ 06. ☐ Network Test Equipment  
☐ 07. ☐ Intelligent Hubs  
☐ 08. ☐ Cables, Connectors, Baluns  
☐ 09. ☐ UPS  
☐ 10. ☐ Network Adapter boards  
☐ 11. ☐ Peer-to-Peer LANs  
☐ 12. ☐ Wireless Networks  
☐ 13. ☐ SNMP.Network Management  
☐ 14. ☐ ATM (Asynchronous Transfer Mode)  
☐ 15. ☐ Remote Access LANs

**A**                      **B NETWORK SERVERS**

- ☐ 16. ☐ LAN Servers  
☐ 17. ☐ File Servers/Applications Servers  
☐ 18. ☐ Print Servers  
☐ 19. ☐ Communications Servers/Fax Servers  
☐ 20. ☐ Data Base Servers (Oracle, Sybase, etc.)  
☐ 21. ☐ Superservers  
☐ 22. ☐ Terminal Servers  
☐ 23. ☐ Remote Access Servers

Involved      Plan to Purchase

**A**                      **B INTERNETWORKING**

- ☐ 24. ☐ Bridges  
☐ 25. ☐ Routers  
☐ 26. ☐ Gateways  
☐ 27. ☐ Bridge/Routers  
☐ 28. ☐ Intelligent Hubs  
☐ 29. ☐ Communications Servers

**A**                      **B COMPUTERS/PERIPHERALS**

- ☐ 30. ☐ Micros/PCs  
☐ 31. ☐ Minis  
☐ 32. ☐ Mainframes  
☐ 33. ☐ Pen-Based  
☐ 34. ☐ Laptops  
☐ 35. ☐ Workstations  
☐ 36. ☐ Image Processing Workstations  
☐ 37. ☐ Front-End Processors  
☐ 38. ☐ Terminals  
☐ 39. ☐ Printers  
☐ 40. ☐ Cluster Controllers  
☐ 41. ☐ Fax Machines  
☐ 42. ☐ X-Terminals

**A**                      **B SOFTWARE/APPLICATIONS**

- ☐ 43. ☐ Network Management  
☐ 44. ☐ Micro to Mainframe  
☐ 45. ☐ Security  
☐ 46. ☐ Communication/Terminal Emulation  
☐ 47. ☐ Word Processing  
☐ 48. ☐ Operating Systems  
☐ 49. ☐ Business Applications (Finance/Mfg/HR/etc.)  
☐ 50. ☐ Applications Development  
☐ 51. ☐ Data Base Management  
☐ 52. ☐ Spreadsheet  
☐ 53. ☐ Groupware  
☐ 54. ☐ EDI  
☐ 55. ☐ E-Mail  
☐ 56. ☐ Windows/Graphical User Interface  
☐ 57. ☐ 4GL Development  
☐ 58. ☐ Multimedia  
☐ 59. ☐ Graphics  
☐ 60. ☐ Remote Access

**A**                      **B WIDE AREA NETWORKS**

- ☐ 61. ☐ Modems (9.6K bps and over)  
☐ 62. ☐ Modems (under 9.6K bps)  
☐ 63. ☐ T-1  
☐ 64. ☐ T-3  
☐ 65. ☐ Fractional T-1  
☐ 66. ☐ Data Switches  
☐ 67. ☐ SMDS  
☐ 68. ☐ ATM (Asynchronous Transfer Mode)  
☐ 69. ☐ Matrix Switches  
☐ 70. ☐ Packet Switches  
☐ 71. ☐ Protocol Converters  
☐ 72. ☐ Diagnostic/Test Equipment  
☐ 73. ☐ DSU/CSU  
☐ 74. ☐ Microwave  
☐ 75. ☐ Fax Boards/Modems  
☐ 76. ☐ VSAT  
☐ 77. ☐ Fiber Optic  
☐ 78. ☐ Satellite  
☐ 79. ☐ ISDN  
☐ 80. ☐ PBXs (over 1000 lines)  
☐ 81. ☐ PBXs (under 1000 lines)  
☐ 82. ☐ Automatic Call Distributors  
☐ 83. ☐ Voice Messaging Systems  
☐ 84. ☐ Videoconferencing/Teleconferencing Systems  
☐ 85. ☐ Voice Response/Processing  
☐ 86. ☐ Dedicated Leased Line  
☐ 87. ☐ Switched Data  
☐ 88. ☐ Centrex  
☐ 89. ☐ E-Mail/Online Services  
☐ 90. ☐ Image Processing  
☐ 91. ☐ Local Services  
☐ 92. ☐ WATS/MTs  
☐ 93. ☐ International  
☐ 94. ☐ Virtual Networks  
☐ 95. ☐ Frame Relay  
☐ 96. ☐ Value Added Services  
☐ XX. ☐ None of the above(1-96)

6 What is the total number of  
**A: LANs** **B: Workstations/Nodes** in your organization?

	LANs		Workstations/ Nodes
	<b>A</b>		<b>B</b>
1.	<input type="checkbox"/> 5,000+		<input type="checkbox"/>
2.	<input type="checkbox"/> 1,000 - 4,999		<input type="checkbox"/>
3.	<input type="checkbox"/> 100 - 999		<input type="checkbox"/>
4.	<input type="checkbox"/> 50 - 99		<input type="checkbox"/>
5.	<input type="checkbox"/> 10 - 49		<input type="checkbox"/>
6.	<input type="checkbox"/> 9 or less		<input type="checkbox"/>

7 Which of the following network platforms are currently  
 installed/planned? (check all that apply)

NETWORK ARCHITECTURES

Installed      Planned

- A**                      **B**  
☐ 01. ☐ SNA  
☐ 02. ☐ DECNET  
☐ 03. ☐ MAP/TOP  
☐ 04. ☐ TCP/IP  
☐ 05. ☐ DCA (Unisys)  
☐ 06. ☐ X.25  
☐ 07. ☐ Novell IPX/SPX  
☐ 08. ☐ APPC/APPN/LU6.2  
☐ 09. ☐ NETBIOS  
☐ 10. ☐ OSI

Installed      Planned

- A**                      **B**  
☐ 11. ☐ APPLETALK  
☐ 12. ☐ OTHER \_\_\_\_\_

**LAN OPERATING SYSTEM**

- ☐ 13. ☐ LOCALTALK (APPLETALK)  
☐ 14. ☐ BANYAN (VINES)  
☐ 15. ☐ DCA (IRMALAN)  
☐ 16. ☐ DCA (10-NET)  
☐ 17. ☐ IBM (LAN SERVER)  
☐ 18. ☐ IBM (PC LAN PROGRAM)  
☐ 19. ☐ MICROSOFT (LAN MANAGER)  
☐ 20. ☐ UNGERMANN-BASS (NET/1)  
☐ 21. ☐ NOVELL (NETWARE,2X,3X,4X)  
☐ 22. ☐ PROTEON (PRONET)  
☐ 23. ☐ SITKA (TOPS)  
☐ 24. ☐ 3COM (3+,3+OPEN)  
☐ 25. ☐ ARTISOFT (LANTASTIC)  
☐ 26. ☐ HAYES (LANSTEP)  
☐ 27. ☐ DEC (PATHWORKS)  
☐ 28. ☐ OTHER \_\_\_\_\_

**LAN ENVIRONMENT**

- ☐ 29. ☐ 4M TOKEN RING  
☐ 30. ☐ 16M TOKEN RING  
☐ 31. ☐ ARCNET  
☐ 32. ☐ ETHERNET  
☐ 33. ☐ STARLAN  
☐ 34. ☐ FDDI  
☐ 35. ☐ LOCAL TALK  
☐ 36. ☐ 10BASE-T  
☐ 37. ☐ OTHER \_\_\_\_\_

**OPERATING SYSTEM**

- ☐ 38. ☐ DOS  
☐ 39. ☐ UNIX/XENIX/AIX  
☐ 40. ☐ OS/2  
☐ 41. ☐ OS/2 2.X  
☐ 42. ☐ MVS  
☐ 43. ☐ VM  
☐ 44. ☐ VMS  
☐ 45. ☐ MACINTOSH  
☐ 46. ☐ WINDOWS  
☐ 47. ☐ WINDOWS NT  
☐ 48. ☐ X WINDOWS  
☐ 49. ☐ SOLARIS  
☐ 50. ☐ OTHER \_\_\_\_\_

8 For which areas outside of the U.S. do you have  
 purchase influence? (check all that apply)

1. ☐ Europe                      4. ☐ Australia  
 2. ☐ Asia                      5. ☐ Middle East  
 3. ☐ South America                      6. ☐ None

9 Which of the following hardware platforms are  
 installed/planned in your company? (check all that apply)

	Mainframes		Minis	
	Installed	Planned	Installed	Planned
01. IBM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
02. DEC	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
03. AMDAHL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
04. AT&T	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
05. BULL HNIS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
06. DATA GENERAL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
07. HP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
08. TANDEM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
09. UNISYS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. OTHER _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**MICROCOMPUTERS**

(fill in the numbers)

	INSTALLED	PLANNED
11. Macintosh 20,30,40		
12. Macintosh other		
13. PCs based on Pentium		
14. PCs based on 80486		
15. PCs based on 80386		
16. PCs based on 80286		
17. PCs based on 8086/8088		
18. RISC/Unix based wkstns		
19. Other		

10 What is the estimated value of networking equipment  
 and services that you help specify, recommend or  
 approve annually? (check one only)

1. ☐ \$100 million and over      6. ☐ \$5 - \$9.9 million  
 2. ☐ \$50 - \$99.9 million      7. ☐ \$1 - \$4.9 million  
 3. ☐ \$25 - \$49.9 million      8. ☐ \$500,000 - \$999,999  
 4. ☐ \$20 - \$24.9 million      9. ☐ \$499,999 or less  
 5. ☐ \$10 - \$19.9 million

11 Estimated gross annual revenues of your entire  
 company/institution: (check one only)

1. ☐ Over \$10 billion      5. ☐ \$50 to \$99.9 million  
 2. ☐ 1 to \$9.9 billion      6. ☐ \$10 to \$49.9 million  
 3. ☐ \$500 to \$999.9 million      7. ☐ \$5 to \$9.9 million  
 4. ☐ \$100 to \$499.9 million      8. ☐ \$4.9 million or less

12 Estimated number of employees for  
 your entire corporation: (check one only)

1. ☐ Over 10,000      4. ☐ 1,000 - 2,499  
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# ENTERPRISE INTERNETS

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## BRIEFS

**AutoSystems Corp.** has announced a new version of AutoSys, its Unix **job control and scheduling** software. Version 3.0 now supports Oracle databases and provides automatic rollover to another network server should the primary server become inoperable.

AutoSys 3.0 costs \$7,500 per server and \$500 to \$9,500 per client. It is available now.

AutoSystems: (303) 442-1299.

**NetLabs, Inc.** has announced a new version of its management application development environment that the firm says lets users more easily create sophisticated management software.

The **DiMONS 3G Development Environment (DE)** lets application developers define, create and manipulate objects to produce customized, platform-independent management functions. Version 2.0 includes a number of enhancements, including the ability to generate a window displaying all alarm parameters and their color-coded status, and a second window to display detailed information about individual alarms.

Other enhancements include the ability to develop authentication and access control routines, and support for Informix databases.

DiMONS 3G DE 2.0 is available now and costs \$25,000.

NetLabs: (415) 961-9500.

**Operations Control Systems (OCS)** last week announced job scheduling software for **Unix environments**. Called Express, the software runs on Windows-based clients and Unix servers. From the Windows client, the systems administrator can track batch jobs being performed on Unix systems distributed throughout the net. The server software lets Unix systems exchange job coordination messages.

Express for Unix is available now for \$5,000.

OCS: (415) 493-4122.

## LEGENT unveils enterprise mgmt. apps

BY MICHAEL COONEY

Herndon, Va.

LEGENT Corp. last week rolled out a suite of software tools designed to help users get a handle on the performance of their distributed enterprise networks.

The firm announced Paramount/XP, a set of five applications that not only let users monitor the performance and capacity of their nets, but keep track of vendor service responses, all from a single workstation.

"We are building a platform that will provide both legacy and multivendor systems and net management from a single point of control," said Phil Carrai, vice president and general manager of LEGENT's resource management unit.

Paramount/XP applications are built on LEGENT's Cross Platform Environment (XPE) technology. XPE includes middleware code, known as XPErtware, that provides a variety of application program interfaces to multivendor operating systems and programs (NW, April 26, page 6).

The new applications currently run on Hewlett-Packard Co.'s OpenView management platform, but by the end of the year will also support IBM's NetView/6000 and SunSoft, Inc.'s SunNet Manager.

LEGENT agent code is required in all servers or clients Paramount/XP applications are expected to monitor. These agents can reside in IBM OS/2 or AIX, Sun-OS, HP-UX or Windows NT workstations. In the future, Paramount agents will also be able to reside on MVS and Application System/400

platforms, Carrai said.

The first new application, Paramount/XP-Performance, monitors user-defined performance thresholds set in the agent code and is a prerequisite for all the other applications.

After polling agents to gather data, Performance can identify trends for individual devices, diagnose problems, and recommend net or device changes for optimal performance. It displays this data on the HP OpenView screen or on a separate standalone management station, Carrai said.

The Performance application can also gather data from HP's GlancePlus and Performance Collection Software (PCS) agents.

loads of devices on the net. It can also be used to build net models that predict capacity needs and identify potential bottlenecks.

The final three Paramount/XP applications, Paramount/XP-Financial, -Service and -Query & Reporting, give users increased administrative control over their enterprise nets. For example, Paramount/XP-Financial lets information system managers account for and chargeback the costs of net usage to end users.

Paramount/XP-Service keeps track of the service contract agreements users have with vendors. For example, users can keep track of problems and how fast the vendor responded to a service call. Paramount/XP-

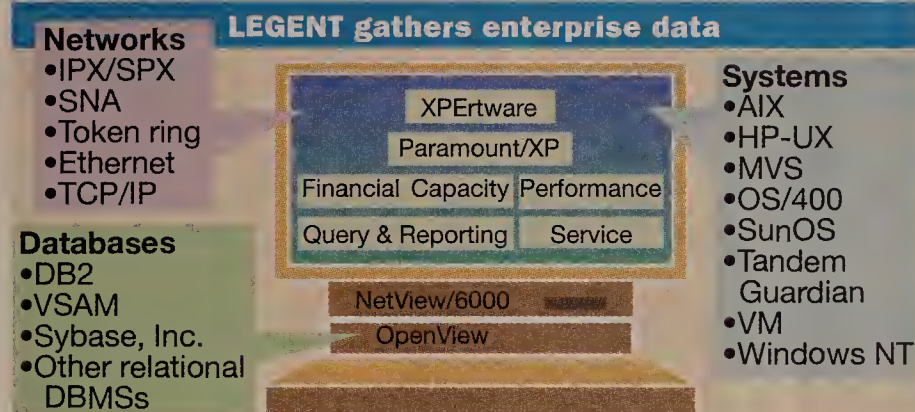
Query & Reporting lets users generate reports on any of the data gathered by the other Paramount applications.

Users said the Paramount suite fills a dire need. "We have the tools to do performance and capacity measurements on our mainframe-based SNA nets, but nothing is really out there to get that information from devices on a distributed TCP/IP network," said Ron Welf, manager of performance

and capacity planning for Charles Schwab, Inc. in San Francisco.

The Paramount/XP base software costs \$11,000. The Performance, Capacity, Financial, Service and Query applications cost about \$1,500 each. The Paramount agent code required on each server or client costs \$500 to \$1,000, depending on the size of the device. All products are available now.

©LEGENT: (703) 708-3000.



LEGENT's new Paramount/XP applications let users track performance, capacity, cost and service levels for distributed computing environments from a single screen and provides for a choice of databases in which to store information.

GlancePlus resides on Unix workstations and lets net managers see CPU utilization, disk memory and other system information. PCS captures and collects performance information and stores it in an OpenView database, allowing users to employ it to generate historical performance reports.

Working with the Performance application, Paramount/XP-Capacity lets users tune the performance and adjust the work-

## DESKTOP VIDEOCONFERENCING

### AT&T, VCON introduce new standards-based video systems

BY ELLEN MESSMER

Dallas

Standards-based desktop videoconferencing got a boost last week from products introduced by AT&T and start-up VCON, Inc., but the road to interoperability remains a rough one.

AT&T unveiled the personal computer-based Vistium Personal Video System 1200, while VCON introduced Armada, a video coder/decoder that can be installed in PCs for desktop videoconferencing. Both products are based on a set of international standards called H.320 but can interoperate only under limited circumstances across a wide-area network due to a lack of standards for videoconferencing and data sharing over local nets.

The Vistium 1200, sold as a video card and camera add-on kit or as a fully equipped 486 PC, lets users set up 15 frame/sec videoconferences to remote sites. The Vistium 1200 works at a maximum speed of 128K bit/sec over switched digital and Integrated Services Digital Network Basic Rate Interface lines.

Real-time sharing of any Windows-based application during a Vistium videoconference is also possible using Vistium Share Software Professional, an AT&T data-sharing application. This data-sharing software — which AT&T intends to also sell separately from the Vistium 1200 desktop system — operates over NetWare 3.11 or Network Basic I/O System LANs. For wide-area connections, it requires a 9.6K bit/sec or faster modem.

The AT&T Vistium desktop system is getting a good reception from users, said S. Ann Earon, president of Lake Wylie, S.C.-based consultancy Telemanagement Resources International. But she noted that interoperability remains a problem in LAN desktop videoconferencing.

For example, the video and audio portion of a Vistium 1200-based conference cannot travel over a LAN, so the system might not be able to communicate with the Armada codec designed to operate over both LANs and WANs at up to 386K bit/sec.

Although it is based on H.320, Armada uses a proprietary packetizing method when transmitting over a LAN because no standard exists as of yet.

"There's not even a de facto LAN video standard," said Mike Clifford, director of marketing and sales at VCON, based here. Consequently, each vendor uses different schemes.

But VCON is confident that its H.320 codec

will work on a wide-area basis with other desktop systems, and the firm is planning interoperability tests with other H.320-compliant desktop systems, including Picture-Tel Corp.'s PCS Live and AT&T's Vistium.

The Armada codec comes packaged with collaborative desktop software called Win2Win, which includes an electronic white board, file-transfer capability and support for the Object Linking and Embedding 2.0 specification.

But an Armada-equipped PC would not be able to share data with a PC using Vistium Share Software Professional, again due to a lack of standards.

The T.120 standards, being developed under the aegis of the International Telecommunication Union, should offer a basis for this kind of data sharing in the future. T.120 should be approved by year end.

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# AnyNet aims to simplify the enterprise experience

BY MICHAEL COONEY

Raleigh, N.C.

Reducing the complexity of multiprotocol networks can be a bit like trying to overhaul the nation's health care system: Most people want to see it done, but there is little agreement on how to do it.

IBM's answer is its Multiprotocol Transport Networking (MPTN) technology, which shows up in the company's AnyNet family of products. MPTN was announced in 1992 as the central communications-enabling technology in IBM's Networking Blueprint.

Mark Pozefsky, IBM's MPTN product and

systems manager, said IBM's goal with MPTN is to reduce the number of networking protocols in enterprise nets and promote application independence from those underlying transport protocols.



"We want to make it easier for a large number of users to access a wide variety of applications, no matter where the users or applications reside in the enterprise," Pozefsky said.

MPTN attempts to achieve this by transparently linking any application to the transport mechanism, such as Systems Network Architecture or Transmission Control Protocol/Internet Protocol nets.

MPTN takes care of address mapping and compensates for the differences between what the application expects to see from the data transport and what it actually gets, he said.

For example, to ship data across an SNA net from an application written to the TCP/IP Sockets interface, MPTN adds a header to the TCP/IP packet that includes the address mapping and other required data.

All of this is done without changing the existing application, and the impact on net performance is negligible, Pozefsky said.

MPTN technology is implemented in AnyNet products for MVS, VTAM, OS/400, OS/2, AIX and Windows operating systems.

AnyNet can be implemented in end stations, such as OS/2 workstations or MVS mainframes, or as a gateway, which IBM also offers on OS/2 and MVS.

AnyNet products reduce complexity by limiting the number of protocols and protocol stacks users have to support as well as the need to run parallel nets to support different applications.

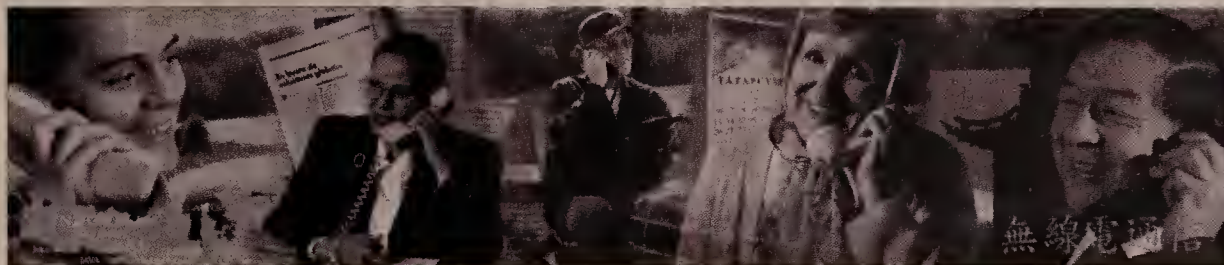
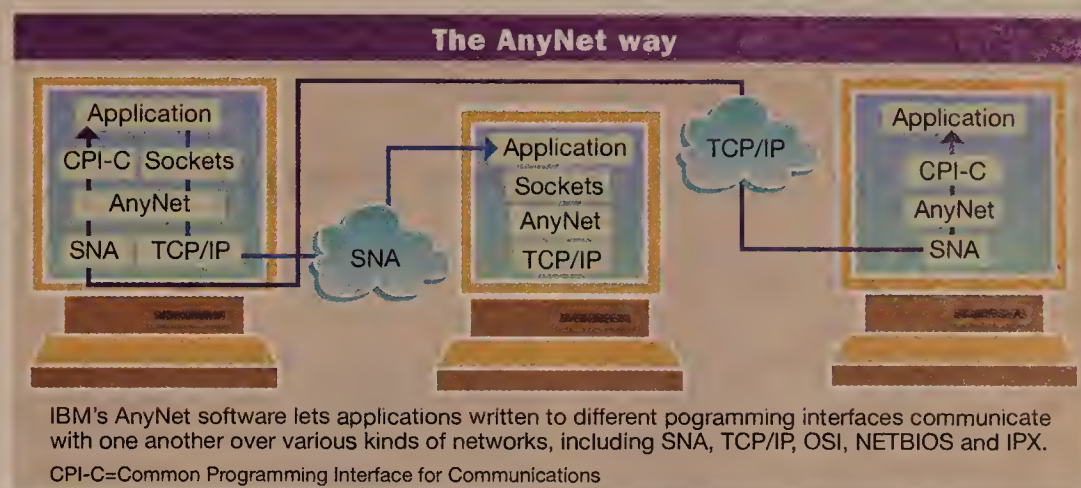
For example, net managers can pick one backbone protocol to support and use AnyNet to map all applications to it. Also, they would no longer need to support multiple communications stacks on each workstation.

Other vendors are slowly rolling out support for MPTN. Proginet Corp. of Uniondale, N.Y., announced an Open Systems Interconnection-over-SNA gateway implementation, and Ki Networks, Inc. of Columbia, Md., announced a DECnet-over-SNA implementation. Protocols, Inc. and PeerLogic, Inc. also announced support for AnyNet technology.

And IBM has submitted MPTN to X/Open Company, Ltd. for adoption as a standard way to link applications to multiple data transports.

"We expect MPTN standards from X/Open by the end of the year," said James Neiser, director of marketing for IBM networking products. "We want everyone to know this isn't proprietary technology, and we will do whatever it takes to gain market viability with AnyNet."

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by Scott Bradner

## Random notes from Prague and elsewhere

**N**ow that I'm back from two weeks in Prague, Czech Republic, it's time for some updates on topics mentioned in previous columns.

The Internet Society (ISOC) International Networking Conference and Technologically Emerging Country Workshop I attended in Prague were, as expected, truly international

gatherings, with attendance even greater than predicted. The workshop attracted 159 people from 71 countries, while 1,205 people from 107 countries attended the conference — and only 16% of them were from the U.S.

The ISOC board initiated discussions about developing guidelines in reaction to the public concerns about the behavior and practices of small numbers of Internet end users and service providers. The board has requested the assistance of the Internet community at large, the society's Internet Architecture Board, which has addressed ethical guidelines in the past, and the ISOC's Advi-

sory Council representing the 85 companies, foundations and government agencies which constitute its organizational members.

In other Internet news, the second of the old regional research and education nets is moving out from its university base. Last July, Bolt Beranek and Newman (BBN), the people who ran ARPANET, formed BBN Technology Services, Inc. (BBNTSI) as a separate company, which then took over the New England Academic and Research Network — now known simply as NEARNET — from its founders Massachusetts Institute of Technology, Boston University and Harvard University.

BBN had been running NEARNET under contract since the net was founded. NEARNET is now a service offering from BBNTSI.

Last week, BBNTSI entered into negotiations to purchase BARRNet from Stanford University after a competition that involved more than a half dozen potential purchasers. BARRNet will also become a service offering of BBNTSI.

As I mentioned in a recent column, this evolution of the Internet is not yet coming from the regional telephone companies but instead from the companies that have seen data networking as their reason to exist, not just something else to do with (or to) their wires.

On the government front, the final report of the Federal Internetworking Requirements Panel (FIRP) has been issued. It is available over the Internet via anonymous ftp from the host [osi.ncsl.nist.gov](http://osi.ncsl.nist.gov). Retrieve the file `firp-report.asc` from the directory `pub/firp`.

The final report tones down some of the pro Internet Engineering Task Force (IETF) language, but it recommends that the current Government Open Systems Interconnection Profile requirement be modified to permit use

of the TCP/IP protocol suite where it would best meet the needs of a government agency.

There is at least one potentially troublesome recommendation.

The authors suggest that the IETF

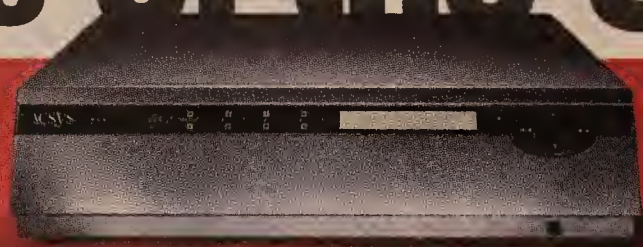
and the relevant ISO group establish convergence workshops to attempt to create a single internetworking layer standard. This comes at a somewhat inconvenient time since the IETF is just about to announce its selection for IP: next generation (IPng), which includes the definition of such a standard. To readdress this issue just after a direction is set would only cause confusion and delay the development of the protocols that are required to sustain the growth of the Internet.

From the words-don't-mean-the-same-thing-everywhere department: Found in a restaurant in Prague, a packet of sugar manufactured by a firm called Snotty.

Disclaimer: I am an ISOC board member and the chair of the NEARNET technical committee. If Harvard has opinions, I don't know what they are so I doubt that these are them.



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# Xerox turns nets over to EDS in \$3.2b deal

BY BILL BURCH

Stamford, Conn.

In one of the largest outsourcing deals of all time, Xerox Corp. has handed over the management reins for much of its internal network to EDS Corp. in a \$3.2 billion, 10-year outsourcing deal.

EDS will assume control of almost all Xerox telecommunications, data processing and computer network operations between June 30 and the end of the year. EDS will also provide and maintain Xerox's computer applications, such as order processing, customer service, manufacturing support, payroll and inventory management.

Altogether, EDS will assume control of Xerox operations in 19 countries, including major data centers in Brazil, the U.K. and the U.S. Plans call for some or all of the Xerox network operations to be folded into EDS' own net. EDS declined to provide specifics on the conversion other than to say network operations would be overseen through EDS centers in England and the U.S.

Xerox announced in March that it would be turning over its computer and telecommunications operations to EDS to focus on its core business of document processing. Xerox's objectives for the deal include reducing information technology costs by as much as 25%, freeing up management personnel, and improving computer and telecommunications services to company personnel, according to Patricia Wallington, Xerox's chief information officer. However, Xerox will continue to be in

charge of architecture, strategy and new program development, she said.

For voice services, Xerox has an AT&T custom contract. EDS will now manage that contract, along with agreements with carriers in Canada, Mexico, Brazil and 15 European countries.

On the data side, Xerox has been running a variety of different networks. The company's Systems Network Architecture net handles most of its traffic, but a limited amount of Transmission Control Protocol/Internet Protocol is also supported over Xerox's T-1 and fractional T-1 nets from AT&T and other carriers. All the data traffic will now run over the EDS network, according to Jagdish Dalal, Xerox's corporate director of global information — management services.

Other outsourcing contracts are almost as big (see graphic), but the Xerox agreement breaks new ground in the reach of operations handed over.

"This is the first contract of its kind that is so complex and so large and with a company that is not in financial straits," said Julie Schwartz, director and principal analyst of professional services with Dataquest, Inc. in Framingham, Mass.

Xerox will keep a core network staff of 750 aboard to monitor the outsourcing contract and plan the firm's strategic direction. Those leaving will include 1,700 employees and contractors who will transfer to EDS by year end.

Xerox may look to other users, such as Chase Manhattan Bank, N.A., to find out what

might happen once its transition begins. Chase asked AT&T to step in and run all its networks earlier this year.

"We were the first to just take the whole thing and say to one common carrier, one provider of service, 'You manage it,'" said Douglas Williams, chief technology officer for the bank. The deal moved 100 jobs over to AT&T; today, all that's left of the bank's telecommunications department is Williams and a core staff of five executives to oversee the AT&T contract.

Other companies have gone through similar personnel cuts in turning over telecommunications to outsourcers. Bethlehem Steel signed a 10-year agreement with EDS in 1993, leading to the transfer of 400 employees and 200 contract personnel to the outsourcer.

Of the 400 employees transferred, roughly 275 were headed for secure, long-term positions. Among the remaining 125, about half eventually wound up working for EDS, according to Tom Conarty, Bethlehem Steel's information technology director.

The outsourcing deal at Xerox could lead to other opportunities between Xerox and EDS, Wallington said. She reportedly told analysts that the two firms are considering joint business opportunities to develop new products.

With Xerox already doing outsourcing work for other companies in printing and imaging and EDS a world outsourcing leader, the partnership is a natural, according to Steve Kerns, manager of information systems outsourcing programs with research firm Input in Mountain View, Calif. □

## Outsourcing mega-deals

July 1989	Eastman Kodak Co. outsources management of SNA networks to IBM.
September 1989	Merrill Lynch & Co., Inc. outsources network management to MCI and IBM for \$50 million.
July 1990	Eastman Kodak outsources voice net to Digital.
September 1990	Continental Airlines Corp. outsources information technology to EDS for \$4 billion.
September 1991	Continental Bank Corp. outsources network operations to WitTel, and software development to Integrated Systems Solutions Corp. (ISSC) and Ernst & Young for \$700 million.
January 1993	McDonnell Douglas Corp. outsources information systems infrastructure to ISSC for \$3 billion.
April 1994	Chase Manhattan Bank, N.A. outsources network management to AT&T for \$90 to \$100 million.
June 1994	Xerox outsources network management to EDS for \$3.2 billion.

GRAPHIC BY SUSAN J. CHAMPENY

# 100 Users, 64 Configurations, 22 Operating Environments, 4 Protocols



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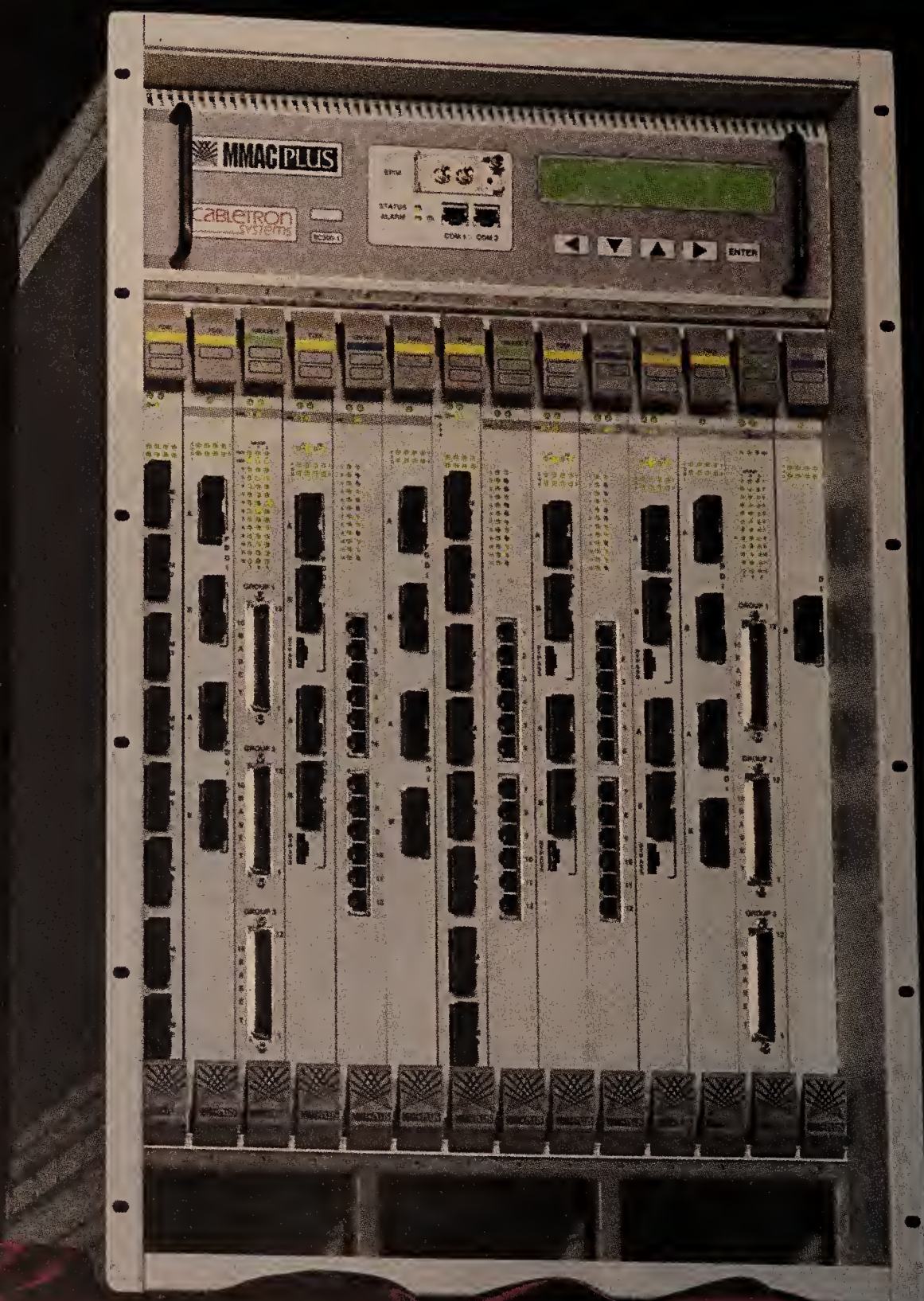
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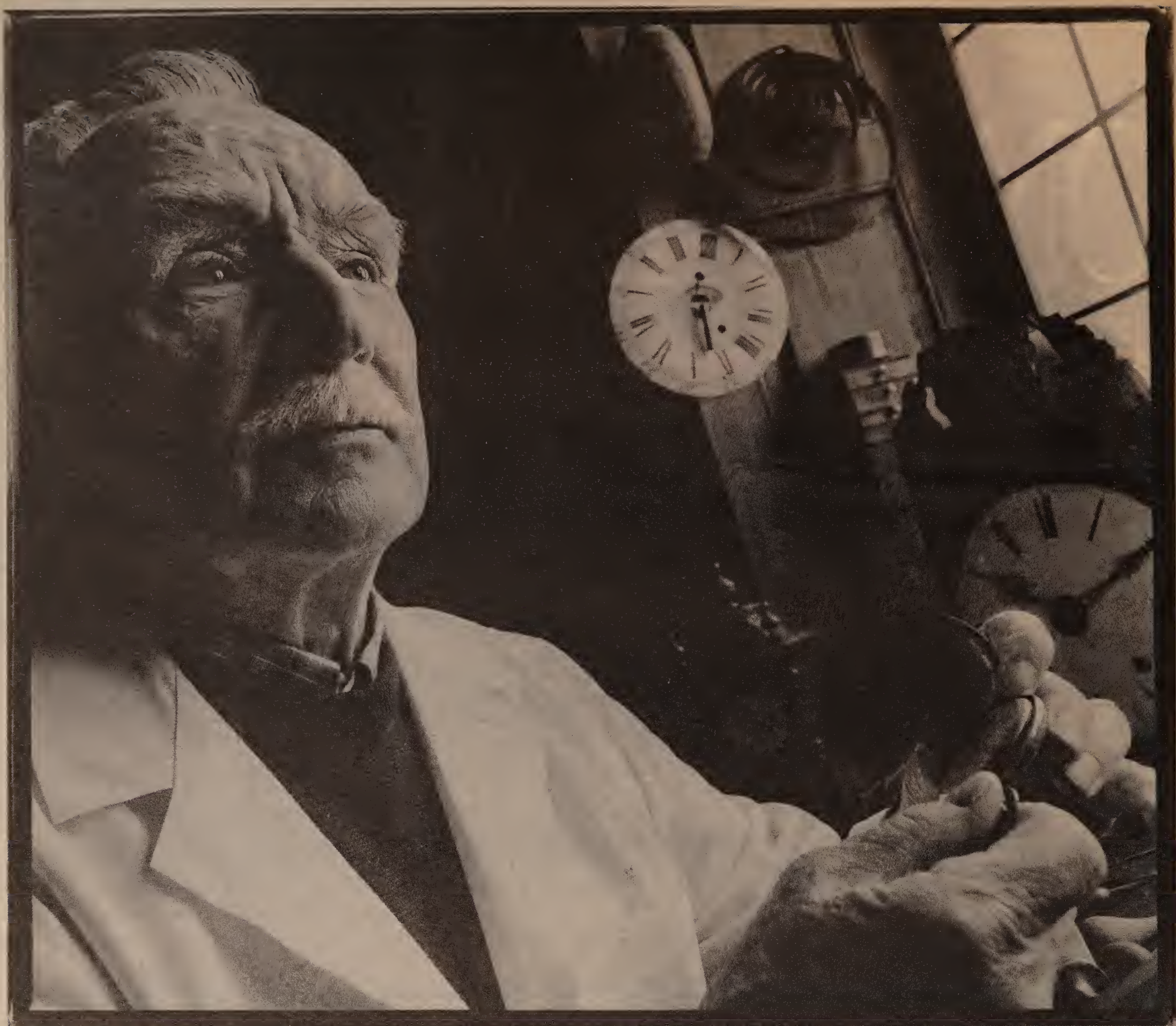
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Circle Reader Service #45



# LAN WORLD

A Special Monthly Section for LAN Decision Makers

## INSIDE LANWORLD

- ▶ Chipcom offers up a suite of new ATM add-ons for its ONcore hub. **Page L4.**
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- ▶ IBM bolsters LAN Server, cuts prices. **Page L9.**
- ▶ Imaging success on LANs? Key is don't throw it on, but redesign the network. **Page L14.**
- ▶ Engineering firm picks ATM, rejects other fast LANs for collaborative apps. **Page L20.**
- ▶ Gibbs examines the family tree of network operating system products. **Page L22.**

## BRIEFS

**Cabletron Systems, Inc.** last week unveiled its first family of full-duplex Ethernet desktop **network interface cards** for Industry Standard Architecture (ISA)-based platforms. The new E2200 adapters will allow an ISA-based personal computer or workstation to simultaneously send and receive data at 10M bit/sec. The E2210 provides a copper and attachment unit interface connection; the E2212 offers a copper and coaxial cable connection; the E2219 has a single copper port; and the E221W supports an external wireless transceiver.

Available now, the cards cost between \$350 and \$450 each.

Cabletron: (603) 332-9400.

**Conner Peripherals, Inc.'s** Storage Systems Group last week expanded its family of **Redundant Array of Inexpensive Disks (RAID)** products for personal computer-based local-area networks with the introduction of a new 4G-byte system. The new CR6-RAID is an external, six-bay RAID system that is configured with four 1G-byte disk drives.

CR6-RAID, which has been fully tested and certified by Microsoft Corp. compatibility labs for use with Windows NT Advanced Server, costs \$8,375. It will be available in July.

Conner: (407) 263-3500.

**Standard Microsystems Corp. (SMC)** last week announced the availability of two hub bundles that provide users with a cost-effective way to add **stackable hubs** to their network environment. The 24-port unmanaged bundle includes two 12-port 3812TP stackable hubs, required cabling, a coaxial cable transceiver module for backbone connection and an attachment unit interface port for use with the transceiver for \$1,695, or \$71 per port.

SMC also provides a 48-port managed bundle that includes four 12-port 3812TPs, the required cabling and transceiver for backbone connection, a network management module and its Windows-based EliteView net management application for \$3,600, or \$75 per port.

SMC: (516) 435-6255.

## Visiting Daytona, Chicago and Cairo

*A road trip designed to clarify what is what with Microsoft's product plans.*

BY JOANNE CUMMINGS

Do Microsoft Corp.'s product plans leave you feeling like you've been on one of those grueling business trips and can't tell one city from another?

Join the club.

When Microsoft first announced plans for improved versions of Windows, Windows NT and a radically redesigned version of NT under the code names Chicago, Daytona and Cairo, respectively, the rumor mill began churning out all sorts of expectations.

Not only is it hard to separate the wheat from the chaff, it is also hard to keep the various products straight.

The reality is that the firm is starting small this August with the next release of NT and NT Advanced Server (NTAS), code-named Daytona and in all probability will be officially called NT Version 3.5.

By year end, it will release a new version of Windows, code-named Chicago, that boasts a new user interface and replaces

the familiar File Manager and Program Manager with a new all-in-one metaphor called Explorer.

And near the end of '95, it will roll out another version of Windows NT, code-named Cairo, that has a distributed architecture and is reportedly based on a new object-oriented file and management system.

As confusing as it may seem, most users and analysts think Microsoft is on track. By first setting out to address key shortcomings in the existing NT 3.1, such as its speed and memory constraints and lack of network connectivity features, Microsoft will make it a more viable network operating system. Only then could it realistically move to retool the Windows interface, and eventually, take the leap to object technology.

"I think the Daytona release will get NT some

more respect as a potential operating system," says Jesse Berst, editorial director for the "Windows Watcher" newsletter in Redmond, Wash. "It lowers the RAM barrier, increases the speed and makes it easier to connect to real world networks. Before, you could only connect conveniently and well to NT networks. And that's not realistic."

### DAYTONA

As the name implies, the workstation and server versions of Daytona will be faster and smaller than their predecessors, Windows NT 3.1 and Windows NTAS 3.1.

According to Microsoft, both the workstation and server versions will take up between 4M and 8M bytes less memory than Version 3.1. In addition, the workstation portion boasts speed improvements in certain graphics applications of between 50% and 100%, while the file server is reportedly 20% to 30% faster — numbers the products' beta users attest to (NW, May 16, page 1).

"The biggest feedback we got from Version 3.1 is that the operating system, certainly on the desktop and to some degree on the server, required too much

See Microsoft, page L10

### Sizing up Microsoft's product plans

<b>Daytona:</b>	New version of Windows NT and Windows NTAS
<b>Likely names:</b>	Windows NT 3.5 and Windows NTAS 3.5
<b>Scheduled availability:</b>	August
<b>Chicago:</b>	New version of Windows
<b>Likely name:</b>	Windows 4.0
<b>Scheduled availability:</b>	Year end
<b>Cairo:</b>	Rearchitected version of NT and Windows NTAS
<b>Likely names:</b>	Windows NT 4.0 and Windows NTAS 4.0
<b>Scheduled availability:</b>	2nd half of 1995

GRAPHIC BY TERRI MITCHELL

## Banyan's new ENS family member: ENS for AIX

BY CARYN GILLOOLY

Westborough, Mass.

Banyan Systems, Inc. this week will bring out the newest member of its Enterprise Network Services (ENS) family — an IBM AIX release that will let customers more easily integrate IBM Unix-based systems, such as the RISC System/6000, into their enterprise nets.

The product, which was expected (NW, June 20, page 2), combines Banyan's core services — the StreetTalk directory, Intelligent Messaging, security, system administration and network management — with VINES in a bundle for IBM's AIX version of the Unix operating system.

Banyan already offers ENS for HP-UX on Hewlett-Packard Co. platforms, ENS for The Santa Cruz Operation, Inc.'s SCO Unix and ENS for NetWare,

which runs on a separate machine attached to a Novell, Inc. NetWare server.

According to Bill Johnson, vice president of product marketing at Banyan, based here, the company plans to bring out ENS for Sun Microsystems, Inc. SPARC platforms running the Solaris operating system "well before the end of this year." He added that by 1995 Banyan plans to release ENS for Windows NT Advanced Server (NTAS) — Microsoft Corp.'s server platform.

Running Banyan's services on other platforms offers users a variety of advantages. Existing VINES customers can easily integrate new high-performance Unix-based platforms as application servers into their current network

See ENS for AIX, page L2

### ENS for AIX pricing

Application server:	\$4,995
20-user license:	\$5,495
50-user license:	\$8,495
100-user license:	\$10,995
250-user license:	\$18,995
500-user license:	\$28,995
1,000-user license:	\$54,995

Prices are based on the number of users that are connecting simultaneously to the ENS server.

## Networking stock hits: Much ado about nothing?

BY SKIP MACASKILL

Despite what Chicken Little is saying, the sky is not falling on the networking industry.

So say industry observers in reaction to the bashing that networking stocks have taken on Wall Street during the last two quarters as financial analysts have downgraded a number of stocks — primarily citing declining growth rates.

But falling growth is a temporary trend that reflects a market in the midst of a product and technology transition and not an indication of any real decline in user demand.

"The idea is that the market must be quickly approaching a saturation level because the industry has been growing so fast that it's bound to hit the wall any time," said Tam Dell'oro, senior analyst at Dataquest, Inc., a consultancy in San Jose, Calif. "Nothing could be farther from the truth. This downward spiral is directly related to a product shift as users step back and decide what direction they want to go in."

Fears of a stalled market were largely fueled by two heavyweights — Cisco Systems, Inc. and SynOptics Communications, Inc. — that recently announced quarterly results that were either below Wall Street

See Stock hits, page L2



# Stock hits

Continued from page L1

expectations or indicative of less than robust performance in the future. A skittish market reacted by knocking down stock prices on those two as well as on companies that compete with them, such as Cabletron Systems, Inc. and Wellfleet Communications, Inc.

Todd Dagres, vice president of equity research at The Robinson-Humphrey Company, Inc. in Atlanta, agrees with Dell'oro that the industry is in transition.

"It's ridiculous to assume that Cisco can retain its phenomenal growth and turn into a \$100 billion company in a couple of years," he said. "It's also ridiculous to assume that the network industry is beginning to dry up. The fact is the industry is entering the next wave of networking, and users are stopping to see which way the current is flowing."

According to Dagres, the industry is nearing the end of a phase that saw the emergence of LAN internetworks and is gearing up for a new era that will be highlighted by five fundamental developments: multimedia networking, network computing, mobile computing,

electronic commerce and deregulation of the communications market.

"This next wave of networking will center on things such as virtual LANs, LAN switching, bandwidth-on-demand networks, and tying in remote and mobile users," Dagres said. "That's why the market is seeing a dip now. Users are evaluating which direction they want to head in."

At the beginning of the year, many networking vendors detailed their LAN switching and ATM plans and how they would help users move to these new switched environments. As a result, many users limited new purchases as

they digested the developments, Dell'oro said.

"A plethora of next-generation hubs were brought out earlier this year with sophisticated architectures that will change the way users set up their networks," she said. "Add the fact that a number of high-speed LAN technologies — such as 100M bit/sec Ethernet, ATM and dedicated Ethernet to the desktop — are clamoring for attention, and it's easy to see why users need to stop and sort everything out."

Wall Street analysts have also cited price erosion as a concern. But Dell'oro said the move to Ethernet switching will more than compensate for the decrease in prices on existing technologies.

"Dedicated Ethernet to the desktop is a market that we're just starting to scratch," she said. "In the first quarter of 1994, dedicated Ethernet switch ports exceeded 50% of the ports shipped during all of 1993. That is a huge ramp. At that rate, revenue for switched Ethernet in 1994 could reach \$250 million." ■

## ENS for AIX

Continued from page L1

infrastructures.

The ENS products also serve as a cohesive link among different systems. For example, using the combination of ENS for NetWare and ENS for HP-UX, users connected to a NetWare or HP-UX server can exchange electronic mail, files and more — and an administrator can centrally manage each of those LANs.

Both these advantages were factors in NYNEX Corp.'s decision to become a beta site for ENS for AIX, said Allan Cronshaw, manager at NYNEX's systems integration department. He explained that NYNEX goes a long way to ensure customer satisfaction through a program whereby the company regularly contacts its customers. NYNEX not only calls customers to advise them of the status of service visits, but it also puts in a follow-up call after a service visit to ask about the quality of service.

The entire system is automated. "We put out three million calls a month," Cronshaw said. A computer dials out and prompts callers to answer questions using the telephone keypad. After the automated responses are received, they are compiled into reports and sent out every 15 minutes to the work centers that performed the service.

NYNEX's corporate net is a mix of Microsoft LAN Manager, Novell, Inc. NetWare and VINES environments distributed throughout the New York/New England area.

"We needed the speed and huge disk space of a RISC machine to handle this heavy-duty usage," Cronshaw said. But NYNEX also needed that machine to work within the VINES environment already in place. So far, so good. "We've been testing this for about three weeks, and it's great. We have no complaints."

But the current application is only the beginning. Today, the central machine sends customer responses to the work centers via StreetTalk if the work centers are running VINES, but users on the NetWare networks get their information via facsimile.

"We plan to update our Novell LANs to run ENS for NetWare," Cronshaw said, allowing NetWare-based systems to receive the response information on-line.

According to Banyan, ENS for AIX can run on any of IBM's PowerPC-, POWER- and POWER2-based RS/6000 machines. The software will be available in September.

©Banyan: (508) 898-1000.

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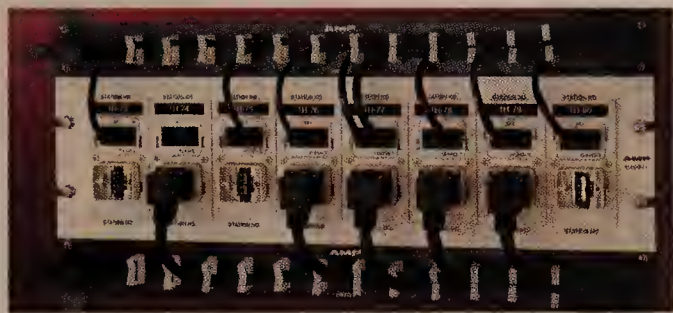
Circle Reader Service #1



*If you were migrating 2400 employees to a new network, which premises wiring system would you choose?*



## *British Columbia chose AMP.*



*Standardized wiring closets provide WCB with simple, fast changes. Inserts in AMP Communications Outlets adapt equipment to wiring and provide the correct connector type.*

The Workers' Compensation Board of British Columbia oversees workplace conditions, handles worker claims and payments, and provides physical and occupational rehabilitation at their Richmond headquarters. Over 2400 employees log a half-million transactions a day on their province-wide network.

When WCB decided two years ago to move from IBM 3270 to Token Ring, they saw a chance to address two key concerns: providing easier connectivity and cutting change cost in their fast-growing net. To meet all their requirements, they needed a premises wiring system that gave

them remarkable flexibility. They found it in the NETCONNECT Open Wiring System, from AMP.

In wiring closets, AMP Communications Outlet patch panels allow wire-once termination of Type 2 wiring to accommodate voice, 3270, and 16Mbps Token Ring. The outlets use exchangeable inserts to match equipment to wiring and provide the proper connector type.

Insert swaps in the closet and at the workstation take only seconds, easily handling the Board's 35 to 50 change orders a day and letting them focus on business: serving the 1.5 million workers of Canada's third largest province.

AMP and NETCONNECT are trademarks.

If you would like more information about the AMP NETCONNECT Open Wiring System, call our Product Information Center at 1-800-522-6752 (fax 717-986-7575). AMP, Harrisburg, PA 17105-3608. In Canada, call 905-470-4425.

Circle Reader Service #5

65925





# Chipcom preps integrated ATM products for hub line

BY SKIP MACASKILL

Southborough, Mass.

Chipcom Corp. this week will give users a glimpse of what's to come on the Asynchronous Transfer Mode (ATM) front when it introduces the first set of integrated ATM products for its ONcore Switching System hub.

The products, which will be available by

year end, will include an ATM backplane upgrade for ONcore and a series of new hub modules, including a multigigabit ATM switch, an Ethernet-to-ATM switch and a family of ATM interface modules for linking workstations and servers into the hub.

Chipcom will also offer an ATM interface for its Galactica Network Switching Hub, a

chassis-based Ethernet switch that Chipcom acquired when it merged with Artel Communications Corp. earlier this year.

The ATM rollout represents the first fruit of Chipcom's partnership with IBM. When the two companies announced their strategic alliance in September 1992, they made it clear that codeveloping hub technology would be a priority, especially in the ATM arena.

IBM currently resells the ONcore as the 8260, and, as part of this week's announcement, Chipcom will make several stand-alone ATM products being developed by IBM, such as the 25M bit/sec ATM Concentrator and a

series of ATM adapters, available to its third-party distribution channel.

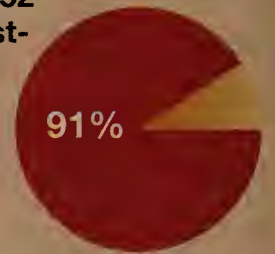
"Chipcom and IBM have a tremendous opportunity to carve out a nice slice of the pie in this emerging ATM market," said Charlie Robbins, vice president of communications research at Aberdeen Group, Inc., a Boston-based consultancy.

"They have the technology, the distribution channels and the experience of working effectively together for the last two years," he said.

The highlight of the Chipcom rollout will be the two-slot ATM switch module, which is based on a single-chip architecture developed by IBM. Big Blue's Prizma chip provides the switch with 8G bit/sec of nonblocking throughput capacity. Chipcom declined to provide more information, such as number of workstation or server connections the switch will support.

The module will also support the connection management services the switch needs to set up and tear down calls, including support for both switched and permanent virtual cir-

**ONcore and Online hub sales accounted for 91% of Chipcom's \$52 million in first-quarter revenue, according to the company.**



cuits, as well as automatic bypass of failed nodes and links. It will also handle route processing based on extensions to the Open Shortest Path First routing protocol, as well as support both the ATM Forum's Private Network-to-Network Interface for connecting switches and RFC 1577, which addresses running Internet Protocol traffic over ATM networks.

The switch module will be used to interconnect a series of User Network Interface (UNI) modules, which will link desktop devices and servers into the ATM fabric.

The initial release will include a 155M bit/sec module that supports multimode fiber or copper connections; a 100M bit/sec module that complies with the ATM Forum's UNI 3.0 specification; and a 25M bit/sec module that will provide cost-effective ATM connections to the desktop over Category 3 unshielded twisted-pair wiring.

The switch and UNI modules will connect to the ONcore via a new switch-based backplane that supports both cell and packet switching. The 2G bit/sec backplane can be field-upgraded without recabling.

## ETHERNET-TO-ATM MIGRATION

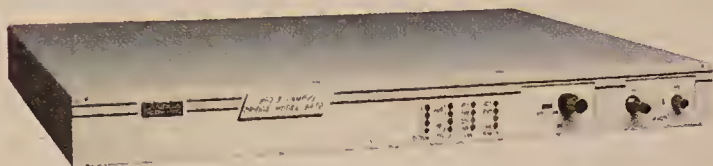
Chipcom's announcement will also address how the company will tie existing Ethernet networks into ATM environments. The ATM interface for the Galactica hub will allow that device to link directly to an ATM backbone network, providing Ethernet users with access to ATM-based servers and other net resources.

Chipcom will also unveil an Ethernet-to-ATM module that will convert Ethernet packets into ATM fixed-length cells for transport across ONcore's ATM backplane.

Chipcom and IBM will also continue to  
*See Chipcom, page L9*

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# Tracking data on the Internet

*Introducing the next generation of tools: Internet Web browsers.*

BY MARK GIBBS

If you've ever had the opportunity to wander the Internet, you know there is a phenomenal amount of information out there, everything from data files, text files, documents, image files, sound files, video files to programs.

With such a huge amount of data available, it is imperative to have sophisticated tools that make searching for information more efficient.

While a tool kit of utilities and navigators — the first and second generations of Internet tools — has existed for some time, it was not until 1991 that an organizing force came into existence.

It was in that year that something called the World Wide Web (also referred to as WWW or W3) was developed at the European laboratory for particle physics (CERN) in Geneva.

The Web, as it is more commonly known, is an attempt to integrate both tools and data through a common data format based on hypertext. The result has been wildly successful. Indeed, it has been so successful that it has become one of the major forces shaping the Internet today.

The Web is based on a method of linking words or phrases in a document to related information either in the same or other documents. Since other documents can be on different servers, these references form a web of links that crisscross the Internet.

So what does this have to do with your local-area network? Web technologies can be used on your network, with or without an Internet connection, and they are free, multiplatform and available now.

Even better, a number of established software developers are in a race to develop the first commercial tools for accessing the Web.

These tools promise to better integrate the Web with the workstation environment and will be easier to deal with from a systems administration viewpoint.

To understand the Web and the programs that access it, we need to understand the major information retrieval and access tools available for use on the Internet.

At the bottom of the tool kit are utilities such as FTP and Telnet. Ftp is the name of the program that uses the TCP/IP File Transfer Protocol to transfer files to and from other computers and Telnet to access remote computers as if you were on a directly connected terminal.

While these tools work very well, they are "blunt" — they only handle data if you know where that data is. This makes them useful only for doing the most basic operations.

These programs were components of the first generation of Internet tools — the Utilities. The next generation, the Navigation tools, began to address the problem of searching for resources.

## INTERNET NAVIGATING

With the vast data riches that have sprung up like mushrooms in every corner of the Internet, a huge demand has developed for tools that can help locate resources.

Finding information is a huge problem on the Internet. The variety of resources available, the sheer number of them (there are, for example, hundreds of high-quality databases and tens of thousands of file archive sites that allow free, public access), and the fact that new resources appear every hour makes being truly current impossible.

The navigational aids available on the net include Archie, a database system for finding files in publicly accessible archives, and the Wide Area Information Server, which can be used to search large numbers of databases and documents.

There are also tools like Gopher, a menu system that links menus on distributed systems (creating its own web of links known as Gopherspace), and Veronica, a search tool for finding entries in Gopherspace.

The navigational tools were, and still are,

very useful. But while they are effective for getting around the Internet, they all handle either a single file format or a limited group of data types.

What is needed are tools that are more generalized in terms of the number of services and the richness of the data they can access. And one of the richest sources of data was the Web, which became the basis of the next generation of Internet tools — Web browsers.

Web browsers are programs that link the tools of the first and second generation and allow access to Web data, providing an integrated resource utility.

## THE SHAPE OF THE WEB

The Web hypertext links act as pointers to other locations within the document or in completely different documents, or to services to be accessed.

While this may sound rather abstract in principle, it becomes extremely powerful in practice.

If you've ever used the Help system under Windows, you have had experience with hypertext. Any word, phrase or graphic in a Help document can be defined so that when you select it, you immediately jump to the pertinent part of the Help file.

Web browsers extend this idea by supporting links between documents despite their location as well as access to services such as FTP and Gopherspace.

For example, a document about networking might refer to Ethernet. If the word "Ethernet" was backed by a hypertext link, selecting it might take you to a description of the technology.

This might, in turn, link to a document about vendors of Ethernet equipment, and selecting a vendor might take you to a document that described that vendor's products. Better still, the vendor's document might list all of the drivers for their Ethernet cards.

Ah! You find that there's a later version of the driver for the card you're using. You could download the latest version simply by clicking on a hypertext link for the driver you use.

**Web technologies can be used on your network, with or without an Internet connection, and they are free, multiplatform and available now.**

## Web browser and HTML resources

### Location of Internet tools you can download:

**Resource: Mosaic (for many systems)**  
Method: Anonymous ftp (password is your ID)  
Site: ftp.ncsa.uiuc.edu  
Directory: /Web/Mosaic-binaries  
File: Mosaic-input your system name here.gz

### Or, for Microsoft Windows 3.X:

Directory: /PC/Mosaic  
File: wmos20a5.zip

### Resource: Cello (for Microsoft Windows 3.X only)

Method: Anonymous ftp (password is your ID)  
Site: fatty.law.cornell.edu  
Directory: /pub/LII/cello  
File: cello.zip

### Resource: Microsoft Windows-based HTTP server

Method: Anonymous ftp (password is your ID)  
Site: sunsite.unc.edu  
Directory: /pub/micro/pc-stuff/ms-windows/winsock  
File: serweb.zip

### Location of HTML tools you can download:

**Resource: WinWord macros for creating HTML documents**  
Method: Anonymous ftp (password is your ID)  
Site: sunsite.unc.edu  
Directory: /pub/micro/pc-stuff/ms-windows/winsock  
File: ghtml.zip

**Resource: WinWord macros for creating HTML documents**  
Method: Anonymous ftp (password is your ID)  
Site: ftp.ncsa.uiuc.edu  
Directory: /PC/Mosaic/util  
File: cu-html.zip

**Resource: HTML Assistant, a Windows-based editor for creating and editing HTML documents**  
Method: Anonymous ftp (password is your ID)  
Site: ftp.law.cornell.edu  
Directory: /incoming  
File: htmasst.zip

**Resource: HyperEdit, a Windows-based editor for creating and editing HTML documents**  
Method: Anonymous ftp (password is your ID)  
Site: info.curtin.edu.au  
Directory: /pub/internet/mswindows/hyperedit  
File: hypedit.zip

GRAPHIC BY SUSAN J. CHAMPENY

## Useful URLs

URLs are used to identify information referenced in documents. These general-interest URLs can be accessed by inputting the following at your system's prompt (the information after the // is the site address followed by the directory path):

### Web overview

<http://info.cern.ch/hypertext/WWW/LineMode/Defaults/default.html>

### Web news

<http://info.cern.ch/hypertext/WWW/News/9305.html>

### NCSA's home page

<http://www.ncsa.uiuc.edu/General/NCSAHome.html>

### NCSA Mosaic What's New page

<http://www.ncsa.uiuc.edu/SDG/Software/Mosaic/Docs/whats-new.html>

### Novell's home page

<http://www.novell.com>

### O'Reilly's Global Network Navigator

<http://nearnet.gnn.com/gnn/GNNhome.html>

### CERN home page

<http://info.cern.ch/>

### Rockwell International Corp.'s home page

<http://mosaic.cmc.com:8080/rockwell/about.html>

## LINKS AND LANGUAGE

Web documents can include not only text, but also style and formatting information, references to graphic image data, as well as links to other data and document types and services. They are written in a special format called Hypertext Markup Language (HTML).

HTML is based on an industry standard called Standard General Markup Language (SGML). SGML is used to create platform-independent documents that specify how their content is to be displayed in a platform-independent manner. HTML goes a step further by defining hypertext links.

The format of an HTML document consists of text to be displayed and tags that define how the text is to be handled, how another data type — for example, image or sound — is to be accessed and formatted, or where a hypertext link points to.

HTML tags are fields in a document that start with a left angle bracket and include a directive, optional data and a right angle bracket to end the tag.

In "<H1>Hello HTML</H1>", for example, the start tag "<H1>" indicates the definition of a heading, and the directive "H" indicates that the text following the tag is a heading. Following the directive are attributes that further define what the directive is to do. In our example, the "1" indicates that it is a first-level heading.

The right angle bracket defines the end of the starting tag. The following text, "Hello HTML", is the data that the tag applies to. Finally, the end tag, "</H1>" (simply the start tag with a "/" embedded), signals the end of the data.

There are tags for hypertext links (technically called anchors), images, titles and many other attributes.

Creating HTML documents is not for the faint-hearted.

At present, there are no true WYSIWYG (What You See Is What You Get) HTML editors. But there are a few options to develop HTML documents (see graphic).

See *Internet*, page L16



# Unix settles in as an application platform

*User reports indicate a growing comfort level among those employing Unix to support demanding apps.*

BY PAULA JACOBS

While few users are ready to bring in Unix to replace NetWare, VINES or LAN Server, companies that have installed Unix servers to support demanding applications say it is the only tool for the job.

Most local network managers readily admit that Unix has added a level of complexity to their work load. Typically, a single LAN environment must now support Transmission Control Protocol/Internet Protocol, as well as Novell, Inc. Internetwork Packet Exchange (IPX) and Banyan Systems, Inc. Banyan IP protocols. But with careful planning and a good implementation plan, the benefits far outweigh the inconvenience.

Not so on the desktop. Despite bullish analyst claims, Unix has never achieved tremendous acceptance on the client side. With the availability of powerful Pentium personal

computers and alternatives such as Windows NT, the future of Unix as a desktop solution is cloudier than ever.

## INVESTING IN UNIX

At Fidelity Investments in Boston, the move to downsize was the driving force behind the introduction of Unix approximately three years ago. Unix supports distributed applications as part of a corporate strategy to migrate financial service applications from the mainframe to a client/server environment. Unix is on the server, and on the desktop are DOS and Windows-based applications, primarily Microsoft Office.

"Unix has been an evolving process as we move from a large SNA architecture to distributed workgroups and

more services on the desktop," explained Jim Doherty, systems manager for Fidelity Investments. "It provides us with more flexibility and enables us to integrate in-house applica-

tions with office automation requirements for greater productivity."

A Novell shop for approximately four years, Fidelity Investments has more than 250 Novell LANs connecting about 5,000 PCs worldwide using IPX, DECnet and IP protocols.

The company has a variety of system platforms, mostly IBM RISC System/6000 and some HP 9000s, that run HP OpenView and IBM NetView/6000 network management tools, as well as financial service applications. The company is in the process of migrating some large CICS financial applications from the mainframe to Pyramid Technology Corp. Unix systems.

"Unix enables us to perform distributed development of new applications and also allows autonomous business units to develop their own applications," Doherty said. The company plans to retain Unix on the server and DOS and Windows on the desktop, while also evaluating Windows NT.

## SPEEDING APPS DEVELOPMENT

For the Washington State Department of Labor and Industry (L&I), the primary reason for Unix and nonproprietary open systems is to integrate off-the-shelf packages without being tied to any particular vendor. "With Unix, it's far easier to integrate systems from multiple vendors," explained Dan Mercer, lead network engineer for the department.

A VINES LAN supports approximately 2,500 users and 95 servers across 25 locations throughout the state of Washington. About 1,700 users access the LAN from corporate headquarters in Olympia, Wash.

Standard business applications are pri-

mary programs on the LAN, which has been in place for six years. Approximately 50% of the VINES LAN users employ Windows, with plans to transition all word processing users to Windows.

The primary corporate data resides on IBM 3990 and Amdahl Corp. mainframes, with IBM's OfficeVision used for office automation applications. There is also a Tandem Computers, Inc. mid-range computer, which is being replaced.

A year ago, L&I decided to add imaging to its environment. At the time, the decision was made to standardize on a client/server architecture. Sybase, Inc. is the database standard, and TCP/IP is the protocol standard. For imaging requirements, the decision was made to implement Recognition Software's Plexus software on an HP 9000 system.

"The primary reason for implementing an open system environment is the capability to develop applications more quickly than on a mainframe," Mercer said. "Our experience is echoed by others."

The right products and services can help streamline LAN integration. Mercer points to success with NetManage, Inc.'s Chameleon, which provides the protocol stack required to write client/server applications. Sybase libraries are also used for links to Sybase databases.

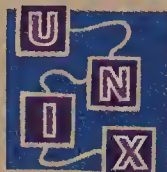
## RETRIEVING MARKETING DATA

The need for ad hoc marketing data was the push behind Unix at the *Los Angeles Times*, according to the publication's Network Services Manager Robert Libertor, whose group supports the newspaper's business systems area. "We introduced Unix for a specific pack-

### Taking a pulse

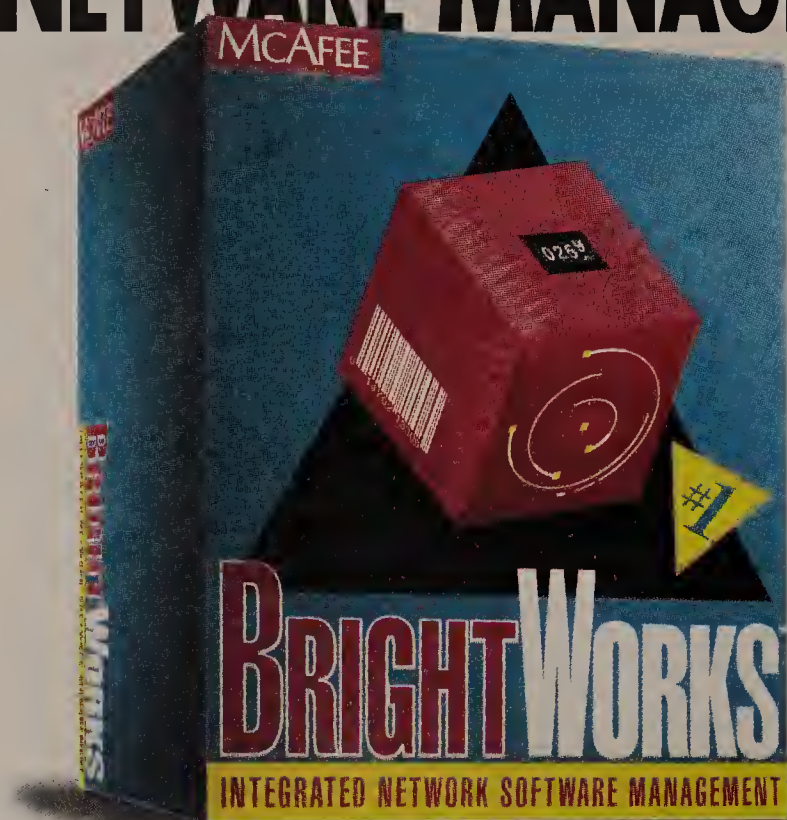
Unix has found a home on the corporate LANs of these companies:

- Continental Grain
- Fidelity Investments
- Los Angeles Times
- Massachusetts Registry of Motor Vehicles
- PG&E
- Washington Department of L&I



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age and have been very pleased," he explained.

The newspaper added Unix to its LAN approximately a year ago in order to support the Marketing Advertising Research System (MARS), which is a Unix-based application package that provides data about advertising trends.

The *Los Angeles Times* runs the MARS application on a Sequent Unix box connected to an IBM 390 mainframe, a Fibronics International, Inc. gateway and a fiber-optic backbone. The addition of Unix has introduced new technical and training requirements, according to Libertor, such as increased requirements for TCP/IP throughout the network as well as retraining of existing staff on Unix.

"All this adds new responsibilities to my role as a network manager," he said. Standards for network access must now include support for IPX, Banyan IP and TCP/IP protocols. That requires a complete reengineering effort on the desktop, including the installation of TCP/IP stacks, so that all three protocols can communicate efficiently.

#### WORLDWIDE USE

Also adding Unix to its LAN environment is Continental Grain Co., whose worldwide agribusiness consists of the production, processing and distribution of feed and food-related items. Currently, the company connects its approximately 1,500 worldwide PC users over a VINES network.

The firm has added an HP Unix platform in order to support an Oracle Corp. database system. According to Eric Dickstein, Continental Grain's lead analyst, Unix will run on the server rather than at the desktop. Plans are to run Oracle using the Banyan IP protocol and to support a variety of trading, administrative, research and human resources applications. The company is also evaluating Computer Associates International, Inc.'s UniCenter for systems management.

One veteran Unix user in the LAN environment is Pacific Gas & Electric, Inc. (PG&E), which has been using both Unix and PCs since the 1980s. The company's network supports 450 VINES servers, as well as a mix of 400 to 500 Unix systems used as application and database servers.

The utility is also implementing an aggressive strategic effort to migrate its proprietary mainframe applications to open systems and a client/server architecture. The plan is to replace human resources, budget and materials-handling applications. The company is running Oracle and Sybase databases on Sun Microsystems, Inc. and other Unix systems.

The company's strategy is to standardize on Unix for database servers and Windows at the desktop.

This client/server architecture reflects a conscious decision not to place Unix on the desktop, according to Art Beckman, manager of client support services at PG&E. Rather,

desktop applications, which include Microsoft Office, Lotus Development Corp.'s Notes and bulletin boards, will remain DOS- and Windows-based.

"We are moving toward TCP/IP with direct TCP/IP connection," Beckman emphasized. Currently, the Ethernet LAN uses Cisco Systems, Inc. routers to support Banyan IP for PC connectivity and the TCP/IP protocol for connectivity to Unix-based hosts. The LAN also connects to a wide-area net, which connects all office locations.

Approximately 20,000 employees use either networked or stand-alone PCs. The network, which covers 93,000 square miles in Northern California, includes 18,000 PCs totally interconnected.

"Our experience indicates that Unix is mature and well suited for the back end but requires more to support the desktop," Beckman said. "However, we are also evaluating Windows NT to determine how well it integrates with any architecture. We are using NT as the database operating system on an SQL server, and so far, we like the speed, cost and performance of NT."

#### UNIX FOR IMAGING

The need for imaging was the principal reason for introducing Unix at the Massachusetts Registry of Motor Vehicles, according to Dave Russo, manager of the registry's LAN Resource Center.

The registry is implementing an imaging system on a Digital Equipment Corp. Ultrix platform as a way to tackle the fraudulent use of Massachusetts licenses. Photos for drivers' licenses will be taken at every branch registry office and transmitted via an X.25 WAN, which connects all the branch offices to the headquarters in Boston.

The registry developed this custom system in conjunction with Lau Technologies, an Acton, Mass.-based company.

Plans call for installation of a Novell 3.12 LAN running IPX/Sequenced Packet Exchange (SPX) protocols at each of the 30 registry branches across the state. Five Novell 24.4G-byte file servers will be installed at headquarters.

In addition to 250 workstations and PCs in Boston, between four and 15 PCs in each branch office will serve as image-capture stations.

Unix and the LAN are no longer distinct environments. Even the most skeptical LAN managers are finding that Unix offers many benefits. However, even experienced users should proceed with caution.

As the state of Washington's Mercer emphasized, "Don't go into Unix lightly; it is not like falling off a log...It also requires a different skill set, so it is important to invest in training."

♦ Jacobs is a marketing consultant and writer who specializes in networking and emerging technologies. She can be reached at [pjacobs@world.std.com](mailto:pjacobs@world.std.com).

**"Our experience indicates that Unix is mature and well suited for the back end but requires more to support the desktop," PG&E's Art Beckman said.**

**"Don't go into Unix lightly; it is not like falling off a log...It also requires a different skill set, so it is important to invest in training," L&I's Dan Mercer said.**

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# HOT

# new LAN tools

*Scripting tool automates control of LAN applications, and security product provides backdoor to NetWare.*

BY MARK GIBBS

In our continuing quest to spotlight hot new LAN products, we turn our attention this quarter to a job server system that runs under NetWare and examine a tool that will let you create a backdoor in NetWare so you can get in if you lose the supervisor's password.

The first product, NLMerlin from Knozall Systems, Inc., is designed to let you run batch-type jobs on network file servers — including backup jobs — and load and unload NetWare Loadable Modules (NLM) or run DOS and Windows applications on a schedule.

NLMerlin is described by Knozall as "a distributed process server for Novell NetWare networks Version 3.11 or higher." NLMerlin essentially executes jobs written in a BASIC-like language on NetWare servers as well as DOS and Windows workstations.

The core of NLMerlin is an NLM called the Administrative Agent (MADMIN) that runs on a NetWare file server. This NLM is the control-

ler that manages the job queues, initiates and controls jobs on servers and workstations, and monitors the status of jobs.

Another NLM called the Task Agent (MAGENT) is run on other NetWare servers to execute jobs.

A terminate-and-stay-resident (TSR) file is loaded on DOS workstations that simply send and receive keystrokes.

While this is enough to control DOS applications, it does not work for Windows. To address this, the DOS TSR can communicate with WinBatch from Wilson WindowWare, Inc. in Seattle, a batch processing facility for Windows.

To create jobs as well as schedule, queue, delete and track them, a Windows utility called the NLMerlin Console is used on a workstation. Jobs can be scheduled to run at a specific time for a single run or on a repetitive basis.

The NLMerlin Console communicates with the server-based MADMIN through a NetWare queue. MADMIN scans the jobs in the queue and executes those that are due to run or passes them on to a server or workstation task agent to be executed.

## RICH SECURITY

Obviously, a system that can distribute jobs to other nodes on a network requires security to protect the network. NLMerlin has a rich security system that allows you to set a password for the Console utility, define the names and passwords for the various MAGENTS and control the level of access they have to various job services.

The actual job scripting language, called Merlin BASIC is quite complex. It includes all of the language features that you would expect (IF...THEN, WHILE).

Also included are commands that allow users to load and unload NLMs, test if NLMs are loaded, write to the server console, test and set variables (in both the NetWare, DOS and Windows environments) and access files.

NLMerlin also comes with a support NLM called General External Identifier that allows Merlin BASIC programs to determine things such as the level of server utilization, number of available volumes and file information.

Another server module, which is known as Event External Identifier, provides the ability to schedule jobs based on events such as trustee changes and volume dismounts.

Still other server modules support file moving, copying, deletion by server jobs and the submission of jobs through templates that can be submitted by workstation users.

NLMerlin is an interesting product. The documentation for NLMerlin does not do it justice, and the few sample job scripts that come with the product do not show its capabilities.

The only helpful scripts include one that demonstrates unloading an SQL database and then running a server backup, and another that is used by the American Red Cross to automate

a custom archive process.

The only major problem we found with NLMerlin was that it could not be unloaded from our NetWare 4.01 server — doing so caused the server to ABEND.

When the server was powered up again, NLMerlin refused to load, saying that it could detect a copy of NLMerlin with the same serial number already running.

This was easily cured by running Novell's BINDFIX utility.

NLMerlin, which retails for \$2,195, is a powerful utility that network managers will find useful where automatic processes can be used to reduce the number of management tasks they have to do.

## CREEPIN' IN THE BACKDOOR

Among the many disasters that a network manager can face, few are more embarrassing than losing the administrator's password. Worse still are the situations where the administrator is not at work and supervisory access to the file server is required.

Whether the loss or unavailability of the password is due to carelessness or because the administrator leaves the company abruptly, gets sick, forgets it or simply goes on vacation, the lack of a password can lead to problems that range from individual network services becoming inaccessible to the shutdown of servers and entire networks.

If you are at all concerned about this problem (which will be the case if it has ever happened to you), there is now a solution for NetWare 2.X and 3.X — a product called SpareKey from Computer Masters International, Inc.

This clever product installs a "doorway" in your system. The doorway is a user account called SpareKey that has supervisory rights (of course, you need supervisory rights to install the doorway).

Access to this user is restricted as the software contains a password that is coded into the SpareKey program.

As every copy of the SpareKey program has a unique password, it is vitally important to keep a backup copy of the distribution disk.

When you need to get access to a server, you execute the SpareKey program from a workstation, find the doorway you want and open it.

SpareKey is network-aware enough that it can find all servers

on the network and display all doorways on any server.

When you choose to open a doorway, SpareKey logs you onto the server as "Spare—Key"

and maps a drive to SYS:PUBLIC. As you have supervisory privileges, you could then change the supervisor account password or just deal with whatever problems need fixing.

Computer Masters also made the Spare—Key user invisible in the list of users when standard NetWare utilities are employed. This means that without using a special utility, such as a bindery editor, the Spare—Key user cannot be deleted or modified.

If you should lose your copy of SpareKey, be warned that it cannot be replaced by Computer Masters.

Moreover, without the original program or a copy of it, all you will be able to do is delete the doorway that it created.

Because the SpareKey program gives whoever uses it supervisory rights, it is crucial that you never copy the program onto the network or leave the SpareKey disk lying around.

## Hot tickets

Company	Computer Masters	Knozall
Product	SpareKey 1.1	NLMerlin 2.01
Platforms	NetWare 2.X and 3.X	NetWare 3.X and 4.X
Function	Backdoor supervisory access to NetWare file servers that allows access if the supervisor's password is lost.	Allows you to create scripts that automate loading, unloading and controlling applications on NetWare file servers, and DOS and Windows workstations.
Pricing	\$295 for a single server license, \$895 for a site license and \$395 for REXX option.	\$2,195

GRAPHIC BY TERRI MITCHELL

Computer Masters will issue you a replacement disk for a small fee if, for some reason, you should need one, but they will only do so if you have registered.

Registration requires that you supply the names of two senior level managers and, after the replacement is issued, Computer Masters sends a letter to the managers named to ensure that you are not up to any hanky-panky — a nice touch.

## THE DOWNSIDE

The only complaints are that SpareKey's interface is clumsy and the program is a little eccentric in the way it does things.

For example, before you can look at the doorways on a server, SpareKey insists on logging you out, which will kill off all connections you may have to other servers.

SpareKey also did not work on a NetWare 4.X server, although other reviewers claim that they had some degree of success.

Those minor issues aside, SpareKey is a nice, simple tool for NetWare 2.X and 3.X. At \$295 for a single server, it is well worth investing in.

©Computer Masters: (800) 383-4380; Knozall: (800) 333-8698.

♦Gibbs is a consultant and writer based in Ventura, Calif., and the author of *Navigating the Internet*. If you'd like to comment, call him at (800) 622-1108, Ext. 504, or E-mail him on the Internet at mgibbs@rain.org.

## REXX to the rescue of power users

While the Merlin BASIC command set allows users to create quite complex job scripts, it may not be enough for some network managers.

To extend the capabilities in the NetWare server environment, Knozall Systems, Inc. has added support for IBM's REXX for NetWare in addition to its own Merlin BASIC language.

REXX for NetWare is potentially a powerful language and curiously one of IBM's best kept secrets. We say potentially because the version 1.00C product as distributed by IBM does not seem to work.

We followed the IBM installation instructions exactly and tried to run the sample programs. Despite actually reading the manual and tweaking the sample code, we never got so much as a "Hello world" printed on the server console.

On the other hand, the version we received from Knozall did work. Unfortunately, there are very few examples in the Knozall documentation to show what can be done, and you would be advised to get ahold of *The REXX Language* by M.F. Cowlishaw (the language's creator) if you want to explore REXX.

REXX support costs \$395.

BY MARK GIBBS

**The only major problem we found with NLMerlin was that it could not be unloaded from our NetWare 4.01 server — doing so caused the server to ABEND.**











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- 9 ☐ one site  
10 ☐ 2-9 sites  
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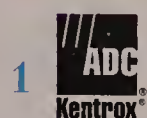
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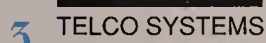
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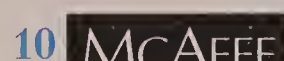
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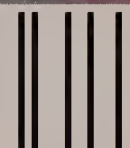




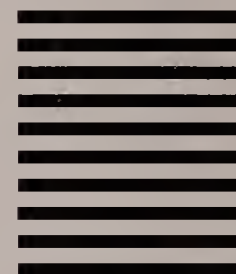
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# IBM unveils price incentives, beta program for LAN Server

BY CARYNGILLOOLY

Austin, Texas

IBM last week outlined a series of incentives to get customers to buy into LAN Server 3.0 today and then upgrade to LAN Server 4.0 when it is officially announced and becomes available this fall.

Big Blue also said it has started the LAN Server 4.0 beta program, which will give an even broader number of users a taste of IBM's next-generation local-area network operating system.

Topping the list of price incentives, IBM is essentially giving away LAN Server 3.0 server software and charging customers for the cost of the client software only.

Starting this week, customers can purchase LAN Server 3.0 Entry with 12 client licenses for \$900. Bigger customers can buy LAN Server 3.0 Advanced with 35 client licenses for \$2,625, also the price of just the client components.

Other price incentives announced last week focused on bringing new customers into the LAN Server fold now and moving them along to 4.0 later in the year.

Phil Powers, marketing director for LAN systems at IBM, said any customer that buys LAN Server 3.0 between now and the time LAN Server 4.0 is released will be able to upgrade to 4.0 for 50% off the upgrade price.

"The upgrade price is significantly less than the price of the regular package, and this is 50% off the upgrade price," he noted, although he would not say what either the regular, upgrade or discounted upgrade price would be.

IBM also announced that it is starting its 4.0 beta program, making beta versions of the product available to any 3.0 user willing to test

it. "[LAN Server 4.0] has been in confidential beta for about one month, but starting June 30, the beta program will be open to all customers," said Susan Rubino, development director for LAN systems at IBM, based here.

There is no cost for testing the product —

users will only have to pay shipping and handling charges to receive the CD-ROMs through which it will be installed. These will be \$9.95 in the U.S. and \$19.95 in the Canada. The product will be sent out in July.

The beta release will have new features that IBM has already publicly discussed, including a new graphical user interface and enhanced peer networking services, as well as support for Transmission Control Protocol/Internet Protocol, symmetric multiprocessing and Intel Corp.'s Pentium microprocessor (NW, Sept. 6, 1993, page 1).

Amid all the talk of enhancements and

incentives, Powers stressed that LAN Server is "IBM's strategic network operating system for LANs." (IBM continues to resell Novell, Inc.'s NetWare.) He also emphasized that LAN Server 4.0 will provide the infrastructure for significant future enhancements, such as support for the Distributed Computing Environment (DCE).

"All DCE additions will be snap-on products to 4.0," he said. "LAN Server 4.0 will be the base for all the enhanced services, but customers will not be forced to buy and pay for DCE if they don't want it."

©IBM: (800) 426-2255.

## Chipcom

Continued from page L4

develop products in several ATM areas, including both Ethernet and token-ring local-area network emulation, which allows an ATM network to carry LAN traffic without requiring changes to existing applications.

The companies will also work on congestion control issues that crop up in an ATM network by developing reserved bandwidth connections that support specific quality-of-service metrics, as well as available bit rate services to handle bursty data traffic.

This announcement represents the first time that Chipcom has provided such detail about its ATM strategy — a move analysts said will be welcomed by the hub maker's existing users.

"Chipcom needed to tell its users its vision on ATM to reassure them that product will be there when they need it," Robbins said. "The company just released details of its net management strategy, as well, so users are starting to get a clear picture on where Chipcom is headed."

Pricing and availability concerning the new ATM products will be announced later this year.

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# Microsoft

Continued from page L1

memory and was slow," says Matthew Ragan, Microsoft senior product manager for Windows NT Personal Workstation Marketing. "So the first thing we did was reduce the size requirements and improve the performance overall."

According to Ragan, the improvements are more dramatic on the workstation side, where performance has doubled for some graphics applications and disk access has improved by

35% to 40%.

The second biggest complaint about Version 3.1, according to Ragan, was its lack of NetWare connectivity. "The fact that we weren't shipping a NetWare redirector meant that a lot of people who had Novell networks were not allowed to install Windows NT," he says. The redirector for Windows NT 3.5 became available the first week in June, but in Daytona, it will be integrated into the product.

"When you install Daytona, you will have the option of installing our NetWare redirector to be able to connect into Novell servers," he says. "The client-side redirector gives you the

ability to not only act as a client to a NetWare server, but also to run all the NetWare Management Services and utilities. So you can actually manage your Novell servers from an NT workstation."

In addition, the product will include a new Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) stack, further enhancing its ability to connect to NetWare networks. "IPX/SPX is the default protocol when you install Windows NT in Daytona," Ragan says. "Before it had been [NETBIOS Extended User Interface], which was our very small, very lightweight, very fast local proto-

col. But NETBEUI doesn't route well, so we shifted the native protocol to IPX/SPX."

On the server side, Daytona will feature a NetWare Compatible Gateway that will enable NTAS users to access NetWare servers on the same network without running dual protocol stacks, a real concern when running memory-intensive applications.

"The point of doing all this work with Novell is based on a fundamental belief that, irrespective of what operating system they're on, users should be allowed to connect into any other server environment without having to worry whether they have enough memory to run their applications," Ragan says.

Another connectivity plus is Daytona's completely rewritten Transmission Control Protocol/Internet Protocol stack. According to Microsoft, it is both smaller and faster than 3.1's, offering a 100% increase in performance.

## Daytona highlights

**Likely names:** Windows NT 3.5 and Windows NTAS 3.5

**Availability:** August

**Top features:**

- ▶ Memory requirement reduced by 4M to 8M bytes.
- ▶ Performance improvements, with some applications running 50% to 100% faster than Version 3.1.
- ▶ Improved TCP/IP stack.
- ▶ Better NetWare connectivity.
- ▶ OpenGL support.
- ▶ OLE 2.0 support.
- ▶ Improved remote connectivity via SLIP and PPP support.

In addition, the firm has added two new features, Dynamic Host Configuration Protocol (DHCP) and the Windows Internet Naming Services (WINS), designed to make TCP/IP easier to administer.

DHCP lets a workstation be assigned an IP address dynamically from a centrally managed configuration server, rather than forcing an administrator to assign and maintain IP addresses manually. WINS maps computer names to IP addresses, reducing broadcast traffic in a TCP/IP environment.

In addition, Daytona offers better remote connectivity features, supporting 256 dial-in sessions, up from 64, as well as the Point-to-Point Protocol (PPP) and the Serial Line Internet Protocol. The server portion will also support IPX over PPP, enabling the remote administration of NetWare servers.

Daytona will also support OpenGL, for high-performance three-dimensional graphics applications, and Object Linking and Embedding (OLE) 2.0. According to Ragan, OLE 2.0 support enables in-place editing, in which users who have embedded a spreadsheet into a word processing document, for example, may edit the spreadsheet from within the document without having to kick in the spreadsheet program. It also enables users to drag-and-drop between applications.

In addition to those key features, Daytona offers some smaller administration-type tools, such as account lockout after a certain number of bad logon attempts and a dump facility with automatic restart to aid in the event of a server crash.

## WHAT'S MISSING?

Daytona pretty much shores up Microsoft's NT offering, analysts say, but with one significant drawback. "Clearly, the big missing element in Daytona is the Chicago interface,"

See Microsoft, page L12

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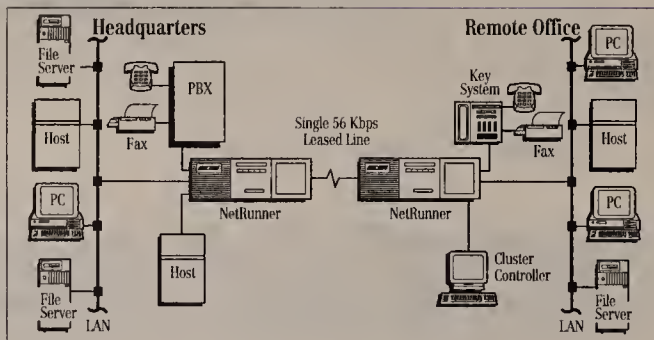


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# Microsoft

Continued from page L10

Berst of "Windows Watcher" says. "If they keep their promise about releasing Chicago by the end of 1994, that means they will have released Daytona within about four months of Chicago. And to me, it's crazy not to have the new improved interface on your high-end workstation operating system."

But the complexity of the operating system makes it less than feasible, Microsoft's Ragan says. "It's not so much four months differ-

ence," he says. "It's more the fact that any time you change a user interface, it's not just as simple as taking out one module and putting in another."

"The user interface in a lot of ways reaches into significant parts of the product, and the kernel we have for Windows NT is a lot more advanced than in Chicago. Underneath all this is a layer of complexity that Chicago doesn't quite have," Ragan adds.

He says a portion of the Chicago interface will be added to Daytona at about the same time as the release of Chicago, but that Windows NT and NTAS will not receive the full

Chicago interface until Cairo comes out in 1995. And the portion of the interface that will be added to Daytona concerns only how applications interface with the operating system and will not include any of the portions visible to the user.

"In essence, we'll add a set of libraries that will map the calls that applications make back into the Daytona graphics interface, and that way, applications at least will see a consistent user interface," he says.

"Distribution on this isn't really determined," he adds. "We may give it to the application vendors to ship with their products, we

may include it within the core NT and do a refresh of the CD and the sources on it, or it may just be distributed on CompuServe."

## CHICAGO

Of the three products, Chicago promises to make the biggest impact, analysts say. "It's clearly aimed at the desktop and everyone's going to see it," says Cheryl Currid, president of Currid and Co., a Houston-based consultancy. "Daytona will be relegated to the back-end server room, but Chicago will be out there for everyone to see."

### Chicago highlights

**Likely name:** Windows 4.0

**Availability:** Year end

**Top features:**

- ▶ New user interface
- ▶ Integrated Plug and Play technology
- ▶ Full 32-bit performance
- ▶ Multitasking and multithreading

Chicago, which will likely be called Windows 4.0 when it is released at the end of the year, offers many modifications to the current version of Windows, the most important of which is the new user interface (see graphic).

According to Microsoft, instead of learning separate applications, such as Program Manager, File Manager and Print Manager, Chicago's interface will enable users to browse for and access resources in a consistent fashion using a single tool, the Explorer.

The interface holds promise for users in multiple server environments because it

**"You have to think it through and phase it and make sure there are some compelling advantages to go through that much pain and expense."**

enables them to provide a single logon to all attached servers. In addition, using one tool, Chicago enables users to search for files anywhere on the net in a consistent fashion by browsing the network, clicking on a server icon, clicking

on the file, and dragging and dropping the file to their desktops. The procedure is identical whether the server is running Windows NT, Digital Equipment Corp.'s Pathworks or NetWare, Microsoft says.

"It's got a totally different metaphor," says Currid, who has seen the interface. "Once you see it and use it for a while, it will probably be easier and more intuitive, but for those of us who have been contaminated by use of the other Windows product, we're going to have a little bit to swallow when we first get it."

Berst agrees. "Chicago will be very successful, but it will have a slow transition and there will be some resistance because of the cost, and more importantly, the time and effort to upgrade people and retrain them on the new interface," he says.

"You just don't move 10,000 people at the drop of a hat," he adds. "You have to think it through and phase it and make sure there are some compelling advantages to go through that much pain and expense. It will be a training issue."

Chicago will also be a 32-bit multitasking operating system that will not need or use a separate version of DOS. This means it won't be constrained by DOS' limitations, and applications could take advantage of the added power of a 32-bit system.

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But analysts say users may have to wait awhile before applications take advantage of these new features. "I don't think there'll be a lot of 32-bit applications out immediately, and the ones that are out won't necessarily take full advantage," Berst says. "People don't really know yet how to do multithreading and multitasking, so expect another one- to two-year lag before really good applications begin to appear."

## PLUG AND PLAY SUPPORT

Another major feature of Chicago will be its support for Plug and Play, an architecture that specifies how software communicates with any device connected to the personal computer. Thus, it enables automatic installation and dynamic reconfiguration of devices manufactured to the Plug and Play specification. For example, users could add a Plug and Play sound card and CD-ROM to a standard PC, turn on the system and play a video clip, all without having to figure out complex installation procedures.

Chicago also provides dynamic reconfiguration in that a Plug and Play docking station will enable users to remove a network-attached notebook computer while it is still running and take it to a meeting. The system automatically reconfigures itself to work with a lower resolution display and adjusts for the absence of a net card and large disk drive. In addition, it automatically makes the adjustments when the user returns the notebook to the docking station.

Still, analysts are cautious. "As wonderful as Plug and Play is, it's not going to have much impact until hardware manufacturers start to support it, and that's still a way off," Berst says. "And there are all these boards we've got right now that don't run Plug and Play. It's wonderful, but it's not like Chicago comes out Thursday and we're in a Plug and Play world on Friday."

Chicago will also incorporate many features of Microsoft's Windows for Workgroups, something network managers would be well advised to focus on.

"From the network manager's viewpoint, Microsoft's putting in a lot of wonderful hooks that will probably make the network manager want to upgrade to Chicago," Currid says. "It will be easier to administer on one hand, but it will also be a little more difficult because you're going to be able to be administrator-less if you want. It could make it too easy for people to run their own nets and get into trouble."

Microsoft's Ragan concedes that is an issue. "People need a way to manage their users and provide access control to resources in the network," he says. "Windows for Workgroups isn't really good at that and in many ways, Chicago will have a lot of the same limitations. So when people look at Chicago, they really should still be looking at Windows NT Advanced Server or NetWare or whatever they're using as the way to provide the management and administration of their nets, and Chicago just becomes the universal client."

## LOOKING AHEAD TO CAIRO

The second release of Windows NT and NTAS, code-named Cairo, will probably be called Version 4.0 and is optimistically scheduled for release by the end of 1995.

Cairo will feature the same user interface as Chicago, as well as Chicago's Plug and Play capabilities (see graphic).

But perhaps the biggest change Cairo brings to Windows NT is its object-oriented file system, called the Object Store.

Traditional file systems contain files with a number of properties, such as whether they are system, hidden or read-only, as well as attributes that relate to size, date and name.

"An object-based file system takes all those elements and throws in an additional layer of information

above that that details the kind of information file system enables users to manage the data

## Cairo highlights

**Likely names:** Windows NT 4.0 and Windows NTAS 4.0

**Availability:** 2nd half of 1995

### Top features:

- ▶ Based on object-oriented file system called The Object Store.
- ▶ Will pick up new user interface as well as Plug and Play capabilities of Chicago.
- ▶ Based on a distributed architecture utilizing RPCs.

the file represents," Ragan says. "So rather than just using your own terminology and saying a .DOC file always means a Word file, you can call it anything you want. But the properties of the object always indicate that it's a Word file."

He said an object

inside any object. "You can think of it as one object composed of many smaller objects, so every word in a document essentially could be treated as an object in this system," Ragan says.

This would be useful for a word processing applications, for example. Applications that take advantage of the Object Store would enable users to search on a disk for a particular word, pull up a list of all the documents in which it appeared and let them choose the one they want.

In the end, Cairo will enable users and  
See Microsoft, page L21

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Circle Reader Service #3



# Imaging and LANs: For best results, design it right

BY TOD NEWCOMBE

Utah's state legislature introduces some 1,400 bills during its 45-day legislative session at the beginning of the year, and for each bill there are usually dozens, sometimes hundreds and occasionally more than a thousand pages of supporting documentation.

So it's no surprise that the Office of Legislative Research and General Counsel, where the bills are researched, has introduced imaging to improve information access and reduce storage needs in the small but historic capital.

It's also not surprising to hear that performance on the existing local-area network has suffered since the imaging system was

installed. For researchers, image retrieval time is often painfully slow.

Staff who use the LAN for business applications have been plagued by network time-out hassles. These problems have contributed to delays in getting the system up to speed and a missed opportunity to use imaging during the most recent legislative session.

Utah is not alone with its image-related networking problems. Many other organizations have installed LAN-based imaging systems in the hopes of streamlining paper-choked operations, only to see them sputter because of networking issues. Part of the problem is the

notion that imaging is simply another business application that can be added to the LAN.

"I don't know anybody today who has enough horsepower on their network where dropping in an imaging system is not going to have an impact," says Mark Scheffel, vice president for Universal Systems, Inc., a systems integrator for document management systems. A growing sideline of USI's is helping organizations upgrade their LANs to improve imaging performance.

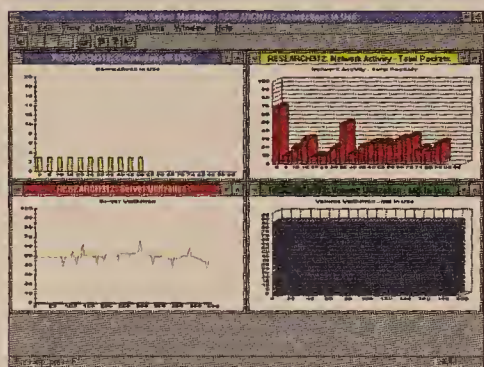
According to Scheffel, when USI installs an imaging system, it usually redesigns the network as opposed to trying to integrate an imaging application into an existing network.

Redesign doesn't necessarily mean a big reinvestment in equipment, Scheffel adds. "We typically go in and look at the customer's capacity today, their plans for growth and the type of imaging system they need to install.

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Circle Reader Service #15

#### How to succeed with imaging LANs

- ◆ Do not simply add imaging; redesign the network around it.
- ◆ Isolate imaging traffic from the rest of the LAN.
- ◆ Use dedicated imaging servers.
- ◆ Use prefetching to speed up retrieval times from jukeboxes.
- ◆ Use imaging products that are geared to take advantage of specific network operating system features.

What we do is add routers and low-end bridges, segment LANs much more carefully and try to isolate imaging traffic from run-of-the-mill network applications. These changes are just additive costs. The customer's basic investment is still intact."

#### AVOIDING THE HIT

Back in 1991, USI installed a LAN-based imaging system in the state of Wisconsin's Department of Public Instruction (DPI) to streamline the paperwork involved with certifying public school teachers.

The department already had a 10Base-T Ethernet-based NetWare LAN with dozens of personal computers for general business applications, as well as a Hitachi Data Systems mainframe, which handled the department's critical databases.

USI installed a 16-seat imaging network — valued at \$480,000 — that included servers for imaging files and an Oracle Corp. database, the optical jukebox, a scanner and a printer. A gateway was added to allow certification analysts to use data from the mainframe with the imaging system.

An Ethernet backbone connects DPI's LAN on the third floor with the computer room on the fifth floor, where the mainframe and LAN file servers are located. USI decided to hardwire the imaging server on the third floor directly to a file server on the fifth floor where images are stored on magnetic disk until certification processing is complete.

Two and a half years later, the imaging system has operated continuously without any negative impact on the network, according to Jim Wall, a director in the department. Wall credits the lack of trouble to the use of dedicated imaging servers. "The traffic through the server hasn't slowed us down at all," Wall says, adding that the network will soon support the mainframe database, which is being ported to another dedicated file server on the LAN.

See Results, page L18



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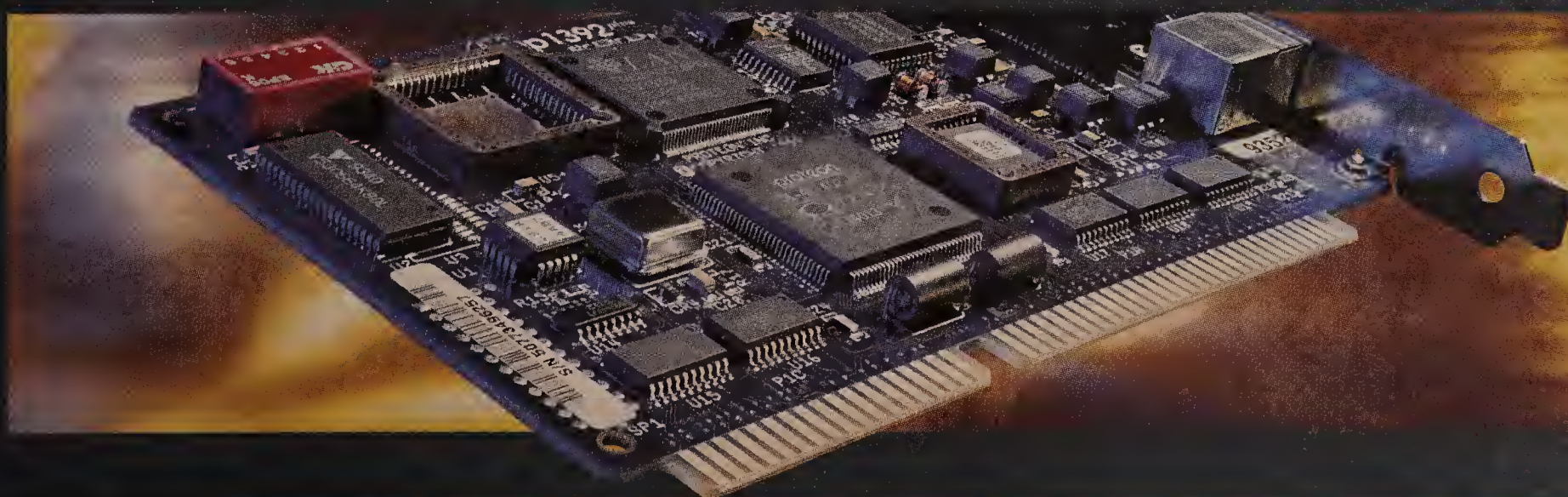
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# Internet

Continued from page L5

There are HTML-aware but non-WYSIWYG editors, such as the Apple Computer, Inc. Macintosh Hypercard Editor or the WinWord macros from the Georgia Institute of Technology Research Institute.

There are also partial-WYSIWYG editors such as the one available on NeXT Computer, Inc. platforms or the Windows-based HTML Assistant, a shareware program currently in alpha release.

You can also use translators that will convert standard Rich Text Format documents to HTML, again for the Macintosh.

While all of these are useful, none does a complete job and all create documents that require tweaking to make them effective. On the other hand, creating simple documents is not that hard.

## URL LOVE IT

A concept that is central to Web browsers is Uniform Resource Locators (URL).

URLs are used to identify the location of resources referenced in documents. For exam-

ple, the URL for the National Center for Supercomputing Applications' (NCSA) home page (the term for the starting point in a set of documents that an organization makes available for access) is "http://www.ncsa.uiuc.edu/General/NCSAHome.html".

The "http:" component specifies that access is via a HyperText Transfer Protocol (HTTP) server.

HTTP is a protocol that is defined by its creator, Tim Berners-Lee, as having "the lightness and speed necessary for a distributed, collaborative, hypermedia information system. It is a generic, stateless, object-oriented protocol,

which may be used for many similar tasks, such as name servers and distributed object-oriented systems."

The next portion of the URL, "http://www.ncsa.uiuc.edu" describes which computer the data is on. Finally, "General/" defines where the document "NCSAHome.html" is to be found.

As starting places to begin exploring the Web, try the NCSA and CERN home pages. If you are a NetWare site, you will be able to access everything that is on NetWare through Novell's home page.

And for information about the Internet, check out the NCSA's Mosaic What's New page (see graphic, page L5) and O'Reilly's Global Network Navigator, a truly excellent production.

**While there have been several programs developed to browse the Web, none have captured the imagination of Internet users more than Mosaic.**

## BROWSING THE WEB

While there have been several programs developed to browse the Web — notably the eponymous WWW and Lynx (both nongraphical browsers) — none have captured the imagination of Internet users more than Mosaic.

Developed by the NCSA and released in 1993, Mosaic is a kitchen sink kind of tool. It combines the functions of several of the basic Internet tools and navigators with a graphical user interface.

An alternative to Mosaic on Windows-based systems is Cello. Cello was developed by the Legal Information Institute at Cornell University Law School.

Mosaic and Cello make very effective front ends for introducing novices to the wonders of the Internet. It is also much easier to get novices using Web browsers than trying to educate them in the complexities of the first and second generation of Internet tools.

Because Mosaic and Cello are so powerful visually as well as being easy-to-use and multiplatform, they also make great tools for corporate-wide information services.

## BROWSERS ON YOUR NETWORK

Currently, Mosaic is available for Microsoft Windows, Macintosh, X Window, OSF/1 Version 1.3, Ultrix 4.0, HP-UX 9.01, AIX 3.2.4, IRIX 4.0.X, and Solaris 2.3 and SunOS 4.1.3.

Cello is only available for Microsoft Windows.

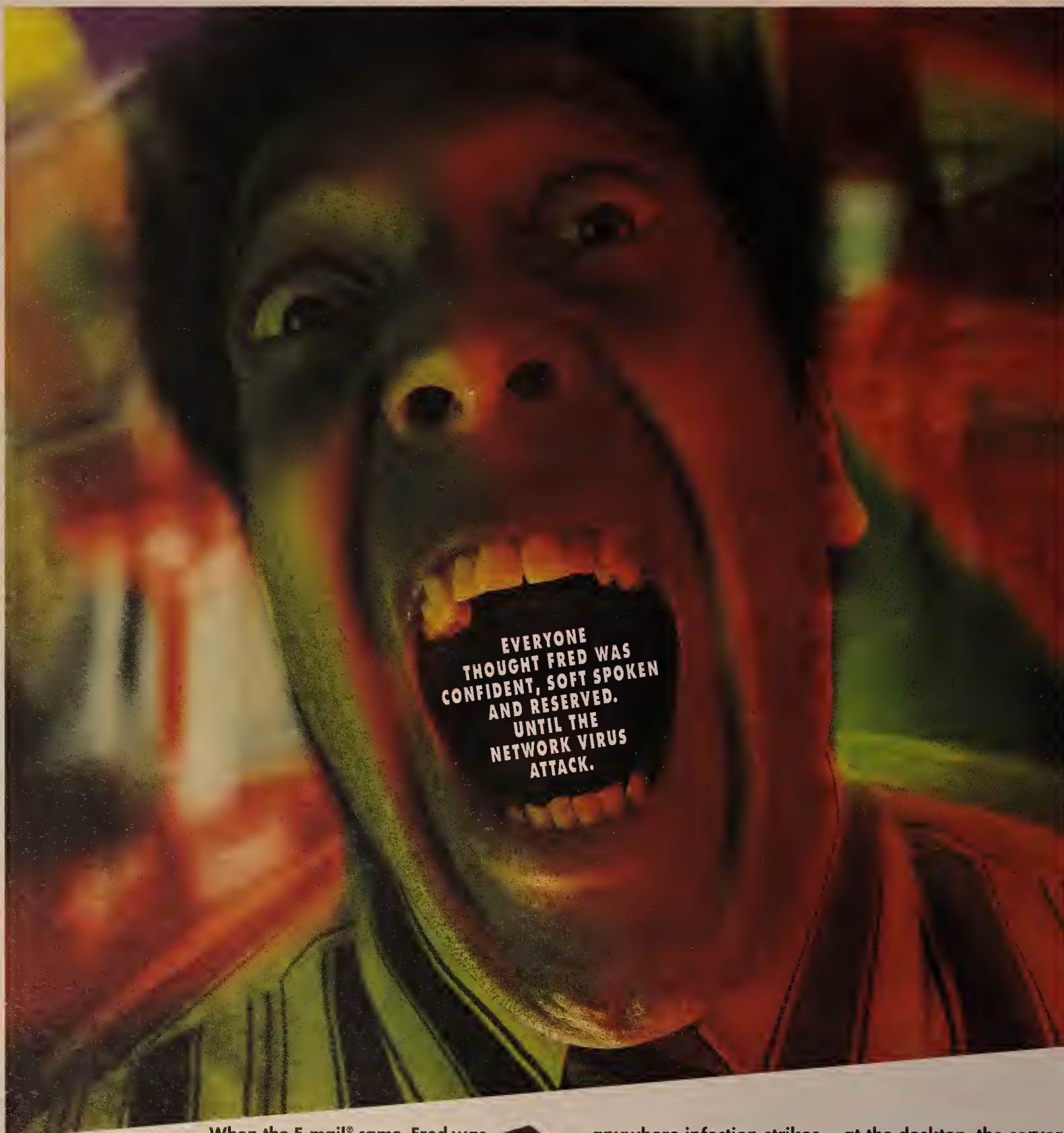
If you intend to access an HTTP, FTP or Gopher server on your network or out on the Internet, you'll need a Transmission Control Protocol/Internet Protocol stack on your computer.

However, if you are only going to load local text and HTML files, you can just run Mosaic or Cello without TCP support.

With TCP support on your network, you can run HTTP (now available for Unix and Microsoft Windows) and Gopher servers (only available for Unix at present). FTP servers are available on most major platforms and as a NetWare Loadable Module for NetWare.

Due to intense competition in the TCP application suite market, you're about to see an explosion of new programs that are based on Mosaic and Cello.

Mosaic has already been licensed from the See Internet, page L18



When the E-mail® came, Fred was updating the server and whistling show tunes. Suddenly all the files turned to hieroglyphics, changing him into a profane, screaming madman. Such catastrophes are all too common among managers with blind faith in desktop protection and its users.

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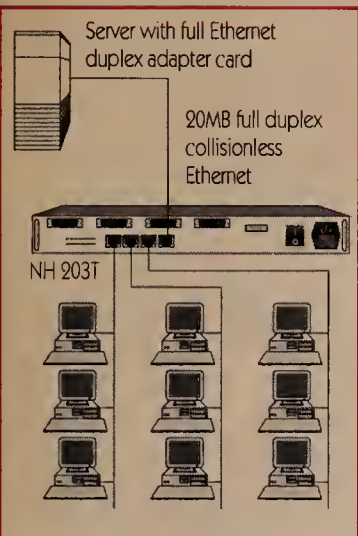
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Flow control allows one segment to "see" traffic on another segment, without actually carrying the traffic itself. Unlike our competition, this allows buffering to be done at the computer nodes rather than at the switch. The final result is a favorable balance of traffic between segments without loss of messages or bandwidth.

In addition to flow control, the NH 203A also incorporates a high speed filtering system, with a MAC address learn time of less than two microseconds. Also included is a non-blocking "clear channel" architecture featuring twelve independent data paths, each with its own storage. This allows for 480 Mbits of internal bandwidth which insures that any port can transfer messages to any of the other three ports at any time. With flow control and clear channel architecture, the NH 203A is the only low delay switch which allows for full broadcasting and forwarding of messages under any traffic conditions.

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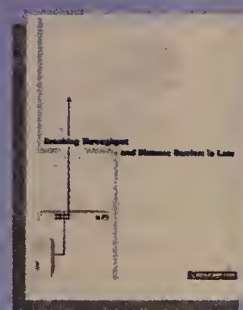
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# Results

Continued from page L14

DPI, however, is not resting on its laurels. Besides porting the database, it is increasing disk storage space, doubling the amount of random-access memory on the image file server and upgrading workstations from 386s to faster 486s.

Utah's Office of Legislative Research is solving its network problem by isolating the imaging application from the rest of the LAN using an Asante Technologies Corp. eight-port

hub to create a subnet, says Chris Calcut, a data processing specialist for the office. "What we've done is add another highway for the imaging users to use. The traffic problems are gone," Calcut says.

The imaging system runs on a 10Base-T Ethernet-based Novell, Inc. LAN with approximately 100 seats, of which about half have or will soon have access to imaging for occasional use. Currently, only about five researchers use the imaging system on a regular basis.

On a larger scale, the University of Cincinnati Medical Center hopes to tackle its network-related imaging problems with a major

overhaul. The imaging system there supports 55 regular users, another 650 occasional users, four scanners inputting 13,000 pages per day and two jukeboxes that hold 7.2 million document images.

All of these components are tied together with an Ethernet running NetWare.

According to Mary Ellen Mahoney, assistant administrator for the hospital, the imaging system has grown rapidly, making imaging the biggest application on the network in a relatively short period of time.

Unfortunately, network performance has been slowing down, despite the use of pre-

fetching, a process that reduces use of the optical jukebox and the network by taking document images off optical platters during evening hours and putting them in magnetic storage at individual workstations, where they can be quickly retrieved by workers the next day.

The hospital has decided to replace its Ethernet infrastructure with Fiber Distributed Data Interface in an expensive but necessary undertaking. "We'll go from Ethernet's 10M bit/sec to a capacity of 100M bit/sec," Mahoney says.

When the overhaul is completed this summer, the benefits will include everything from rapid retrieval of images in the emergency room, where time is of the essence, to remote access of images from every one of the center's 20 buildings.

## CARDINAL SINS

According to Scheffel, one of the cardinal sins in imaging is trying to simply attach the technology to the network. "Don't ever add imaging to a network," he says. "Redesign instead." Scheffel urges customers to work with vendors experienced with both imaging and networks. "You need someone who understands the impact of document management systems on an existing network," he explains.

Scheffel has seen a number of cases where an imaging system has failed because of poor performance. "With a little bit of foresight and some extra money, they could have planned out a network where the system would have succeeded."

♦ Newcombe is a free-lance writer based in Longmeadow, Mass.

## Internet

Continued from page L16

NCSA by companies including The Santa Cruz Operation, Inc., Spry, Inc., Quadralay Corp. and Quarterdeck Office Systems. A few dozen more are negotiating, and NCSA says that a few hundred are queued up.

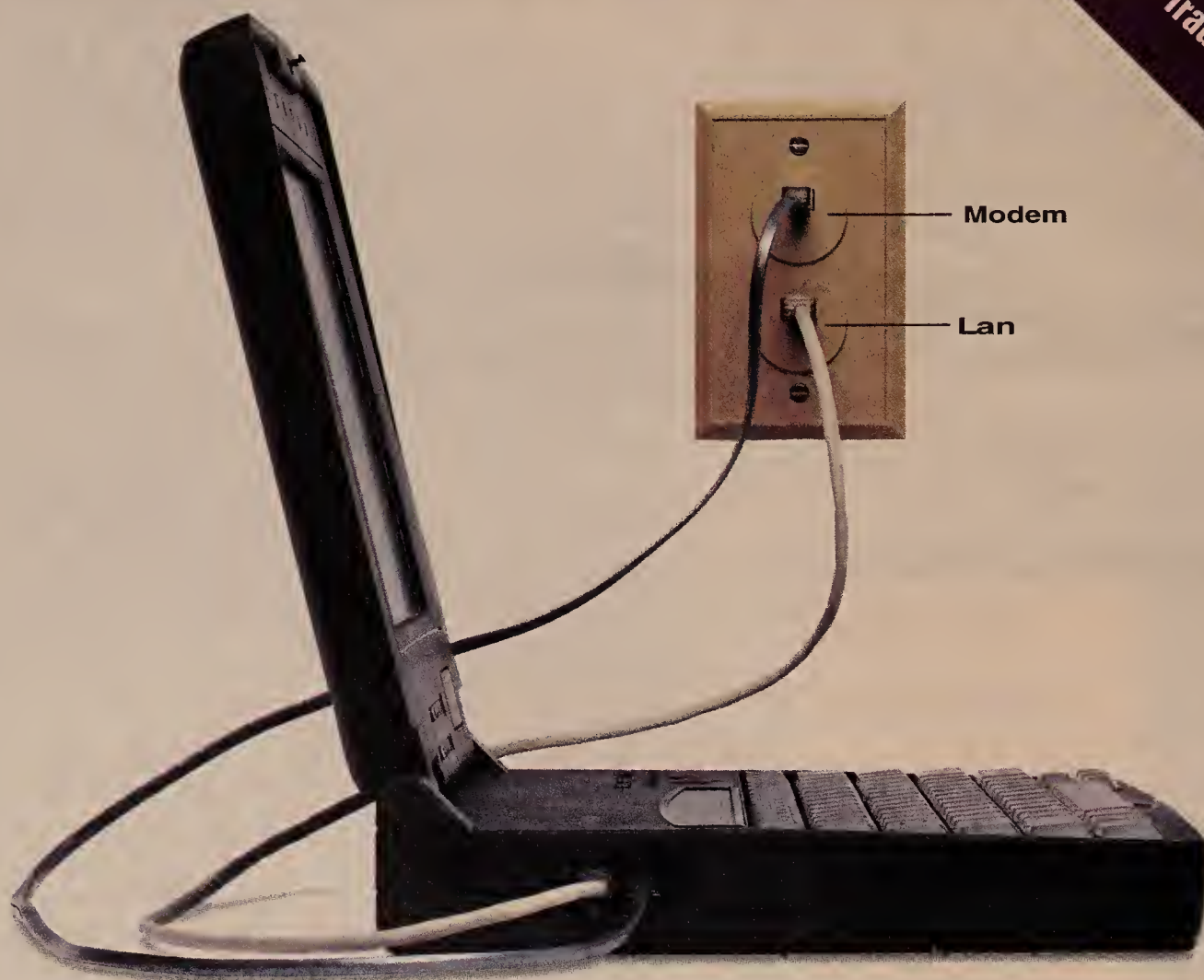
This will lead to better integration of Web browser implementations with networks and LAN-based resources as well as more flexible and robust implementations.

There are fewer Cello licensees, but notable among them is California Software, Inc. in Corona del Mar, which has launched a new package called InterAp. This package integrates a Web browser with Telnet, FTP and a Messaging Application Programming Interface-compliant electronic mail front end. But more importantly, it has a Visual Basic-compatible scripting language called NetScripts.

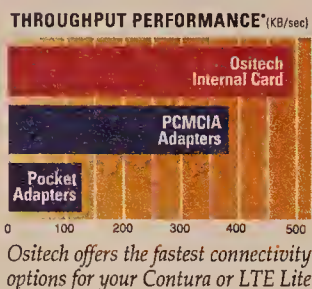
Sophisticated scripting and interapplication communications under Windows and Macintosh are going to have a big impact on LANs, whether or not they are connected to the Internet. Not surprisingly, many of the vendors developing Web-compatible products have said they will include these facilities in their products.

But there is no need to wait. Cello and Mosaic are available today and are free of charge. And you might wind up with a whole new way of looking at your corporate information resources.

♦ Gibbs is a consultant and writer based in Ventura, Calif., and the author of *Navigating the Internet*. If you'd like to comment, call him at (800) 622-1108, Ext. 504, or E-mail him at mgibbs@rain.org.



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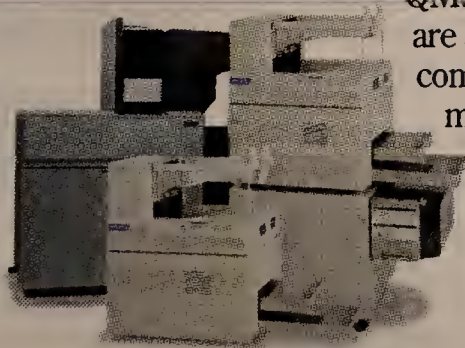
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# ATM provides highway to success for CTC

*Engineering firm rejects other fast LANs to support collaborative applications.*

BY SKIP MACASKILL

Johnstown, Pa.

Ethernet turned out to be a bad match for Concurrent Technologies Corp.'s (CTC) three-dimensional modeling, process simulation and desktop videoconferencing applications.

But after evaluating all of the new high-speed local-area network options, the engineering firm found a marriage made in heaven

in Asynchronous Transfer Mode (ATM).

The company, based here, is a nonprofit subsidiary of the University of Pittsburgh Trust that operates four National Centers of Excellence for the Department of Defense.

CTC, which specializes in metallurgy, environmental studies, factory automation and manufacturing logistics, is using ATM to run a series of collaborative engineering applica-

tions to determine, for example, if a new metal alloy will be strong enough for certain applications such as in various Navy weapon systems.

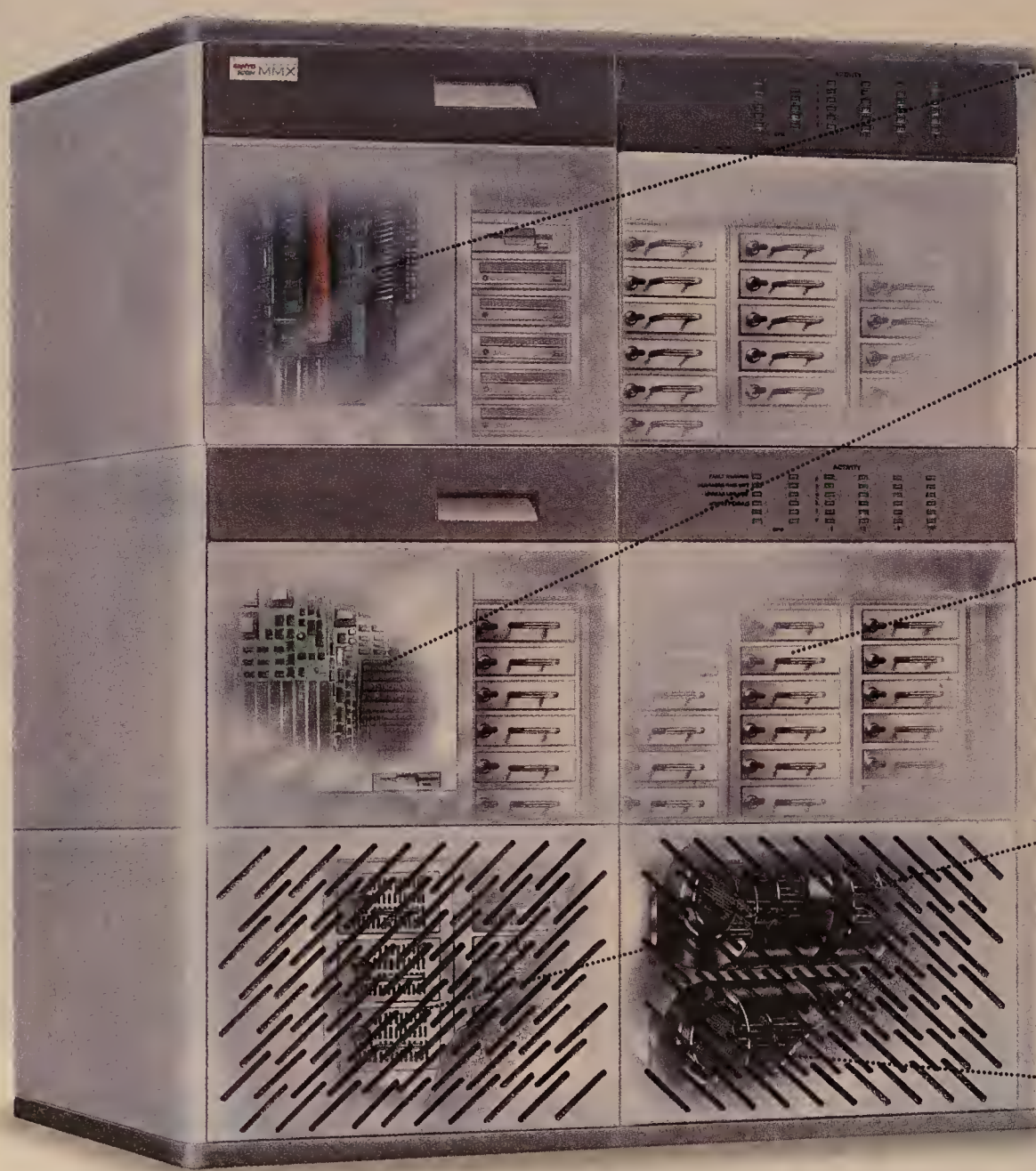
The ATM network — which is a production net, not a test bed — is anchored by four Fore-Runner ATM Switches from Fore Systems, Inc. which deliver 155M bit/sec of bandwidth to more than 50 high-end Unix workstations. One switch is located in each of CTC's four build-

ings and are linked via fiber at 140M bit/sec.

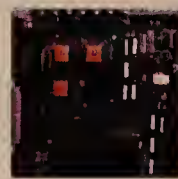
Each switch also has a 10M bit/sec connection to a Cisco Systems, Inc. AGS+ router, which provides access to the company's Ethernet network. The Ethernet, comprising approximately 200 personal computers and Macintoshes, supports a variety of administrative applications, such as electronic mail and accounting.

"Running distributed parallel computing applications across our shared Ethernet LAN was very painful," said Hubert Callihan, technical director at CTC. "We looked at a number of alternatives before deciding that ATM fit the bill in terms of giving us enough scalable, deterministic bandwidth to get our jobs done."

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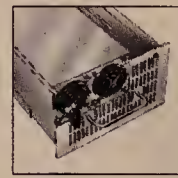
Supports eight 486-based or 14 Pentium processors.



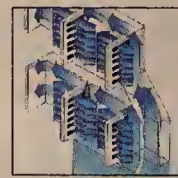
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**A CTC engineer takes part in a desktop videoconference across the ATM network while running a collaborative modeling application that allows him to manipulate the design of a product in three dimensions.**

The options CTC considered and then discarded included:

■ **Routers** — An expensive solution since multiple devices would have been needed to segment the Ethernet network finely enough to get the needed performance boost. It still only delivered a peak of 10M bit/sec and was non-deterministic.

■ **Switched Ethernet** — At the time of the evaluation, switches were going for between \$30,000 and \$40,000. With each workgroup supporting five or six servers, the number of switches needed would have been high, and even though they were dedicated connections, each end node would only be getting a maximum of 10M bit/sec.

■ **Fast Ethernet** — Much confusion remains over the two competing standards for running Ethernet at 100M bit/sec. The technology tops out at that speed and is contention-based. CTC decided it could not wait for the market to decide which standard would prevail.

■ **Fiber Distributed Data Interface** — Similar to fast Ethernet in that the technology is contention-based and is limited to 100M bit/sec.

■ **Fibre Channel** — It was good for building big pipes of bandwidth, but it did not lend itself to a switched environment.

According to Mike Saverino, CTC's principal technical manager, ATM was the best answer because it was deterministic in nature, could scale to gigabit speeds and — despite the myth that ATM is too expensive — offered the best price/performance.

"While the capital outlay with ATM was more than the other high-speed alternatives, we discovered ATM was actually a better buy because it gave more bang for the buck," Saverino said. "If you break down your cost in terms of what you pay for a single megabit of bandwidth, ATM comes out as the least expensive. For the types of applications we run, ATM is cost-justifiable."

A typical 10M bit/sec Ethernet connection, for example, costs \$300 to \$500, so the megabit-



per-second cost is about \$50, while a 100M bit/sec FDDI connection goes for about \$40 for each megabit. According to CTC, ATM is a best buy, coming in around \$32 per megabit.

"If you need to move a large amount of integrated data, voice, video, graphics and images around the network, ATM is the best bargain out there," Saverino said. "It's not the best solution for every company, but if you can justify the use of ATM, you can probably justify its cost, as well."

The new network allowed CTC to significantly increase productivity and reduce time to market, according to John Balash, general manager of systems and software at CTC.

"For us, time to market is key," he said. "[Engineering] processes that took weeks to complete on the old Ethernet network now take only a day or two — sometimes less — with ATM."

The technology also made it easier for CTC engineers to collaborate on projects. Two users, for example, can use the ATM network to run a desktop videoconference and a three-dimensional model simulator concurrently, allowing the users to discuss the design of a particular product while manipulating its image in real time.

And while any one of the components of this session might tax an Ethernet, this collaborative session will not slow down the ATM net, meaning other ATM users can function as normal.

"Users have been pleased with the performance the ATM network gives them," Saverino said. "They are satisfied with response times, and the technology has proven easy to use."

Although initially concerned about the state of ATM standards, assurances from Fore gave CTC confidence to embrace the emerging technology.

"ATM's immaturity and the state of flux in standards gave us some concerns early on, but Fore has promised it will comply with any and all standards that emerge, and we ourselves got involved in the ATM Forum so we could have more of a direct say in these matters," Balash said.

There were also some early problems with driver compatibility between the Fore switches and the software on the high-end workstations, but this was quickly resolved.

CTC was also concerned about managing the new

environment. The company uses Hewlett-Packard Co. OpenView net management platform, and Fore is writing software modules for OpenView that are ATM-specific and will allow CTC to manage all the ATM devices as well as links between those devices.

"There is a risk associated with any emerging technology, but we did our homework, made a management decision and stuck with it," Balash said. "We have not been disappointed." ■

## Microsoft

Continued from page L13

applications vendors to take advantage of "'componentized' software," in which portions of an application are all treated as portable objects.

For example, the various elements of a word processor would all be stored and retrieved as separate objects.

"So if you like all of Word except the thesaurus, you take the thesaurus from WordPerfect and plug it in there," Ragan says. "Cairo pro-

vides the ability to manage all the different types of objects that you may end up acquiring over time."

In addition to its object-orientation, Cairo will also be built on a distributed computing architecture.

"We're implementing several elements of the [the Open Software Foundation's Distributed Computing Environment], most particularly the [Remote Procedure Call] mechanisms to make sure that we get interoperability with other DCE products," Ragan says. "RPCs are the preferred way of passing information between objects in a distributed environment,

so that's what we've decided to do."

Analysts say Cairo is too far away to offer concrete criticisms.

"Cairo is too vaporish right now," Berst says. "In theory, it could have an order of magnitude improvement in how we compute because everything will be a distributed object that we can all find and use no matter where it's located on the network. But I'm not sure Microsoft can pull it off. I think 1995 is very optimistic."

◆ Cummings is a freelance writer based in Marlborough, Mass.

**"It's not the best solution for every company, but if you can justify the use of ATM, you can probably justify its cost, as well."**

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## NET RESULTS

by Mark Gibbs

# If networks were people

**H**aving received a spate of queries about network operating systems during the past few weeks, I thought I'd devote this column to explaining the nature of the key NOSes and related network services.

To make the NOSes easier to understand, let's look at them as if they were people you knew.

**Apple's AppleShare:** This is your aunt Matilda, who is very religious and won't talk to anyone but her children. She completely

ignores everyone else.

**Apple's Macintosh System 7:** Matilda's very religious children who talk only among themselves or people who they think are as equally religious.

**Novell's NetWare 2.X:** This is your uncle Edward, who owns that old house down the block. He used to be big in business, but he's old now and has been on life support for a couple of years. His health care company is about to pull the plug.

**Novell's NetWare 3.X:** Your older brother Eric, who has about a thousand kids. Eric is a fast-talking corporate manager who works

hard and lives in a modern house full of gadgets. He knows all about accounting and organization but has little empathy for his employees or his kids. He's got lots of friends in the business who are wary of him, just as his kids are.

**Novell's NetWare 4.X:** This is your younger brother Tarquin, who manages to talk even faster than Eric. He has been looking for a management job for the past 18 months. He has the most amazing theories about management that no one really understands, and he lives in a house that he can't afford.

**Novell's Personal NetWare:** One of Eric's kids. He's overweight, pimpled and talks non-stop to his siblings. No one is sure what to do with him. He may grow up to be likable or he may get shot "accidentally" in a freak gun accident at home.

**Artisoft's LANtastic:** Here is your cousin Phyllis. She runs a small business and has only a few clients. She'll talk to anyone except Matilda. She's very small and moves pretty fast, and while she knows she should lock the house, she never bothers to.

**Artisoft's Cor-Stream:** This is Phyllis' son who sponges off Tarquin. He's about to graduate, and everyone is curious to see what job he'll get.

**Banyan's VINES:** Your old college professor who everyone refers to as "the Rocket Scientist." His students seem to think he's the messiah, but he's pushed for higher tuition fees, and the students are all annoyed with him.

**FTAM:** This is your crazy old granny who only speaks Esperanto backwards, lives in the attic and refuses to communicate any other way than by passing notes under the door.

**IBM's LAN Server:** Your neighbor Frederick, who was adopted when he was young by very conservative people. He speaks in acuriously convoluted way, and he's really only at home with his adopted parents' family.

**Microsoft's Windows NT Advanced Server:** This is your other neighbor, Robert ("My friends call me Flash, heh-heh. Love your tie, where did you get it? Have you seen my Ferrari?"). He is a sales whiz kid. He is highly visual and is always waving his arms around as he talks. He lives in a huge house and has stuff in every room. He is the type of man who tickles children until they cough up blood.

**NFS:** Your other crazy old granny who runs a lending library. She will only lend to people who speak to her nicely and makes them pin up a photograph of the library in their houses before they can access the books.

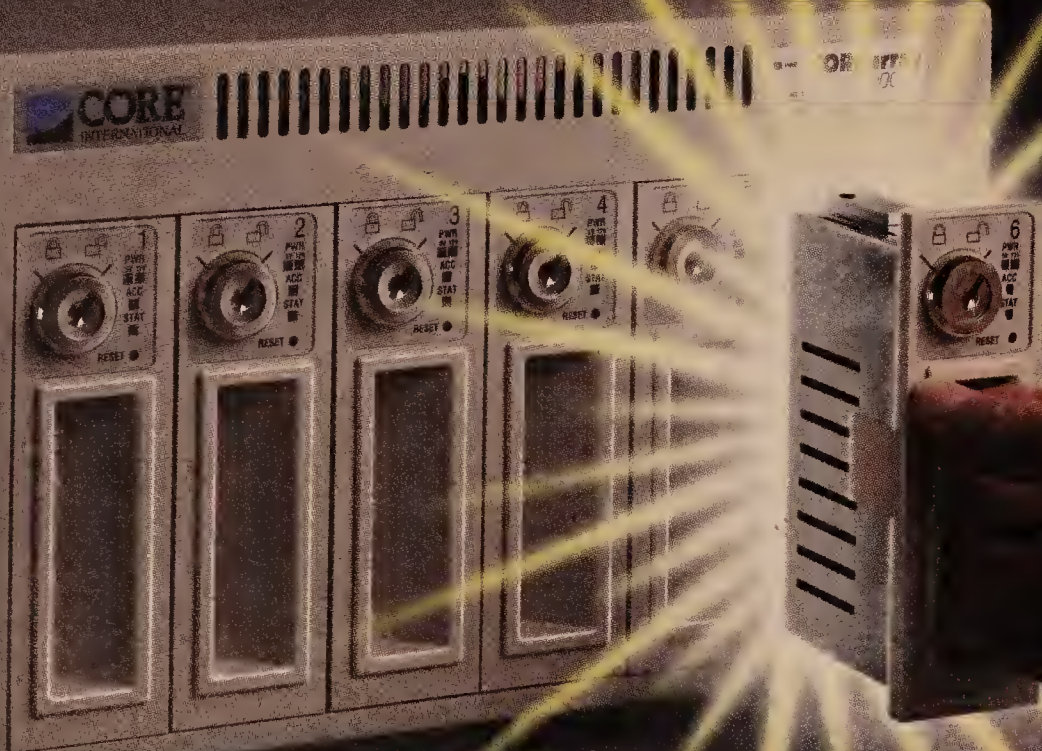
**Windows for Workgroups:** Doug, the older brother of your neighbor Robert. He's not quite as flashy as Bob. He looks similar, although much shorter, and you can see he needs to put on some weight. He has breakdowns at regular intervals and can only do one thing at a time.

So there we have it. Is everything clear now?

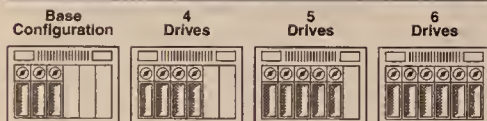
♦Gibbs is a consultant and writer in Ventura, Calif. He can be reached at (800) 622-1108, Ext. 504, or on the Internet at mgibbs@rain.org.

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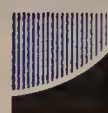
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Circle Reader Service #39



# GLOBAL SERVICES

Voice, Data and Wireless Services, Regulatory Issues and Voice CPE

## AT&T extends reach of satellite net

*Carrier provides connectivity service between dissimilar video networks.*

BY JOANIE WEXLER

Dallas

AT&T last week forged ahead in its relentless interoperability campaign by broadening the reach of its video broadcast satellite net.

At the International TeleConference Association show here, the carrier introduced Vistaswitch, a service that lets AT&T's Telstar satellite net users download video feeds from other networks to capture training, marketing, news and other broadcasts.

Vistaswitch gives customers access to a much wider range of programming and, in some cases, relieves them from having to create their own video content.

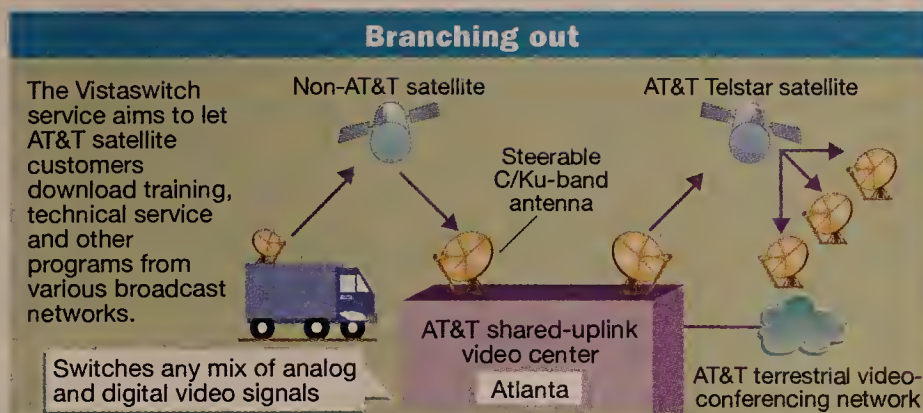
The scheme fits into the networking strategy at nationwide retailer CompUSA, Inc. The Dallas-based company is bringing up an AT&T Tridom satellite network and would have thought twice about it if not for this capability, said Thomas Kunze, director in the advanced technology and strategies group.

One reason, he said, is that the retailer offers customers classroom training and technical services on the products it sells using programming put together by those products' manufacturers. "Now I have access to their programs and don't have to recreate them for my own net," Kunze said.

The AT&T Tridom division's video center in Atlanta collects signals from non-AT&T satellites and "turns around," or rebroadcasts, them through its own satellite or terrestrial videoconferencing net (see graphic), said Tim Harrington, Vistaswitch product-line director.

The service allows an AT&T Telstar satellite to receive programming from virtually any

other satellite in the continental U.S. and ship those feeds to its customers' nets, he said. A key use, he added, might be communication to



and from emergency sites, where portable satellite dishes might not be compatible with the nearest in-sky satellite.

Today, some of the barriers to connecting non-AT&T satellites include differences in

encryption schemes, dissimilar radio frequencies, analog and digital net mismatches, and varying compression methods. So typically, customers run a fixed analog network communicating with one satellite and transmitting only to certain receivers, explained Elliot Gold, a consultant and president of Telespan Publishing Corp. in Altadena, Calif.

"Now they should be able to drop their information into any network in the country," he said.

Vistaswitch will not necessarily convert everyone. Jim Fowler, director of systems integration at Navistar International Transportation Corp. in Chicago, said, "We're still looking at it, but we figure you need to commit to satellite for five years for it to pay out."

In that time, he said, with the cost of land-lines continually coming down, Asynchronous Transfer Mode will likely be more useful and economical.

AT&T also announced its Skynet Hub Service for linking customers' wired local-area networks with broadcast video services. □

## BRIEFS

The regional Bell holding companies are not buying the caveats within a Department of Justice go-ahead to allow the RBHCs to provide wireless long-distance services on a par with non-RBHC competitors. The Justice Department said it will honor the RBHCs' 1991 request for a consent decree waiver from cellular restrictions — but with limiting conditions.

The RBHCs have filed comments with U.S. District Court Judge Harold Greene that these conditions are unacceptable.

AT&T said it will introduce a version of its Software-Defined Network (SDN) Network Administration System that will allow users of AT&T's forthcoming integrated U.S.-Canadian SDN service to electronically request changes to their networks. U.S. SDN customers already have this capability.

Sprint Corp. last week inaugurated two wireless methods to access SprintNet, its public data network. Under the first method, customers traveling with computers equipped with cellular modems can now dial in on the toll-free number (800) 546-2500. Modem support through this number includes Microcom Networking Protocol-10, supporting speeds up to 14.4K bit/sec. The second method involves a network-to-network interface between SprintNet and RAM Mobile Data's wireless networks.

Sprint: (800) 736-1130.

The trend for competitive access providers to offer services outside the country's biggest cities continued last week when Teleport Communications Group, Inc. (TCG) inaugurated a 45 route-mile fiber-optic network in central New Jersey. The network, incorporating Princeton and Trenton, will interconnect with TCG's 80 route-mile network in northern New Jersey.

The state of Virginia seems determined to keep interexchange carriers (IXC) out of the business of carrying toll calls within a local access and transport area. A Virginia public utilities commission spokesman said the agency will insist on keeping IXCs out of LATAs until local exchange carriers are allowed to carry long-distance calls.

## SNMP gives users look into frame relay cloud

BY BILL BURCH

Washington, D.C.

Some light is finally making its way into what was long viewed as an unmanageable black hole — the frame relay cloud.

Burgeoning carrier support for the Simple Network Management Protocol is giving managers the data they need to monitor network performance and build confidence in public data services (see graphic). With the SNMP data, managers can keep a close eye on their ports and permanent virtual circuits (PVC) and hold carriers accountable for network performance.

At Analog Devices, Inc. in Norwood, Mass., Senior Communications Analyst Jon Sault uses Hewlett-Packard Co.'s OpenView to monitor AT&T frame relay links that connect company sites in Europe, North America and the Pacific Rim.

Sault mostly uses OpenView to monitor alarms generated by SNMP traps that alert him to problems with ports and PVCs. When a problem does occur, he has programmed his platform to wait five minutes before sending out a page to

See SNMP, page 32

### Carriers offer SNMP platform options

	AT&T	MCI	Sprint	WiiTel
AT&T's StarSentry	✓			
Castle Rock Computing, Inc.'s SNMPc Network Manager for Windows			✓	
HP's OpenView	✓	✓	✓	✓
IBM's NetView/6000	✓	✓	✓	✓
SunSoft's SunNet Manager	✓	✓	✓	✓

GRAPHIC BY SUSAN J. CHAMPENY

## CompuServe turns to TechSmith for remote LAN access

BY BILL BURCH

Columbus, Ohio

CompuServe, Inc. has moved to bolster its remote LAN access service by buying a piece of TechSmith Corp., the vendor that provides the client software used with the service.

The two companies will work together to meet customer demands for enhancements, including network access via Integrated Services Digital Network lines and simultaneous multiprotocol sessions.

At the remote end, TechSmith's software functions as the X.25 communications package for client workstations. Within CompuServe's net, TechSmith code filters local net packet acknowledgments to speed up transmissions.

With Basic Rate Interface links down to \$50 per month or less in some states, ISDN access beats out dial-up, said Caroline Michel, a senior carrier services analyst with International Data Corp., a research firm in Framingham, Mass. "If you're doing any sort of on-line database searches or a lot of file exchanges with other users, it's much more valuable to have higher speeds — it's worth the money," she said.

At the server end, CompuServe currently supports Novell, Inc. Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX), Network Basic I/O System, NETBIOS Extended User Interface and Transmission Control Protocol/Internet Protocol protocols on Ethernet, token-ring and Arcnet networks. The multiprotocol support, due out shortly, will let remote users jump between multiple protocols during a single session.

"More companies are looking at a requirement for simultaneous multiple protocol access, where you might be logged on to a NetWare network and have an IP session with a Unix host," said TechSmith President William Hamilton.

Other improvements due out soon include support for added clients. TechSmith's software now runs on MS-DOS and Windows machines, and will soon support OS/2, Windows NT and Macintosh computers. □



# Cellular protocol wars escalate

AT&T Paradyne collects supporters in Microcom attack.

BY JOANIE WEXLER

Largo, Fla.

The endorsement of an AT&T Paradyne modem protocol by several carriers last week could improve service performance and give users more freedom of choice when buying cellular modems.

AT&T Paradyne said cellular network operators Ameritech Cellular Services, Bell

Atlantic Mobile, Systems, Inc., BellSouth Cellular Corp., NYNEX Mobile Communications, US WEST Cellular and others will support its Enhanced Throughput Cellular (ETC) protocol for error correction on their circuit-switched data-over-cellular nets.

Virginia Beneke, AT&T Paradyne senior product marketing manager, contended that there are performance benefits with ETC over

competing protocols — most notably MNP-10 from Microcom, Inc. — as long as a transmission is initiated by an ETC-equipped device.

Microcom took issue with Beneke's claim. "MNP-10 and ETC are roughly equivalent," said Gregory Pearson, senior vice president of technology management at Microcom in Granada Hills, Calif. "AT&T, in a partisan way, will claim theirs is better. I could make the same claim."

Protocols such as ETC and MNP-10 compensate for poor signal-to-noise ratio in cellular links by adjusting speeds to fit line conditions, reducing data packet size when many errors occur and adjusting signals when passing cellular communications to land-lines.

## FURTHER PROGRESS

Meanwhile, net access vendor Primary Access Corp. plans to announce today at the Wireless DataComm show in San Jose, Calif., that it will add support for both ETC and another contender, Celeritas Technologies, Ltd.'s TX-CEL technology, to its MNP-10 based carrier modem pool. The multiple-protocol support should make it easier for cellular providers to accommodate differing protocols.

Many cellular service providers run Primary Access modem pools in their nets today. However, for now, the relative performance benefits of ETC and MNP-10 remain unproven. Consultancy TeleChoice, Inc., in Verona, N.J., is preparing to conduct benchmarks on modems supporting ETC, MNP-10 and other cellular protocols. The results are scheduled to appear in *Network World* this fall.

"From a performance standpoint, the jury is still out," said Albert Iellimo, a TeleChoice research analyst.

In the meantime, market penetration could be on Microcom's side. Consolidated Edison of New York, for example, is already an end-to-

end MNP-10 shop. John Higgins, senior systems analyst, said he'd consider changing "only if I saw test comparisons that made my hair stand on end or found that our employees were going to invest in portable computers that didn't support MNP-10."

In fact, most of the vendors that last week endorsed ETC already support MNP-10, which was described by Iellimo as a de facto standard.

Bell Atlantic Mobile said it is still testing ETC to see if there are performance benefits to justify an MNP-10-to-ETC translation service.

## Protocol protection

Use of a circuit-switched cellular error-correction protocol reduces connect time and allows faster transfers, which lowers service charges.

### Cellular carrier's switching office

Support of multiple protocols unshackles users from basing modem choice on what carrier supports.

ETC  
MNP-10  
Others

ETC  
MNP-10  
Others

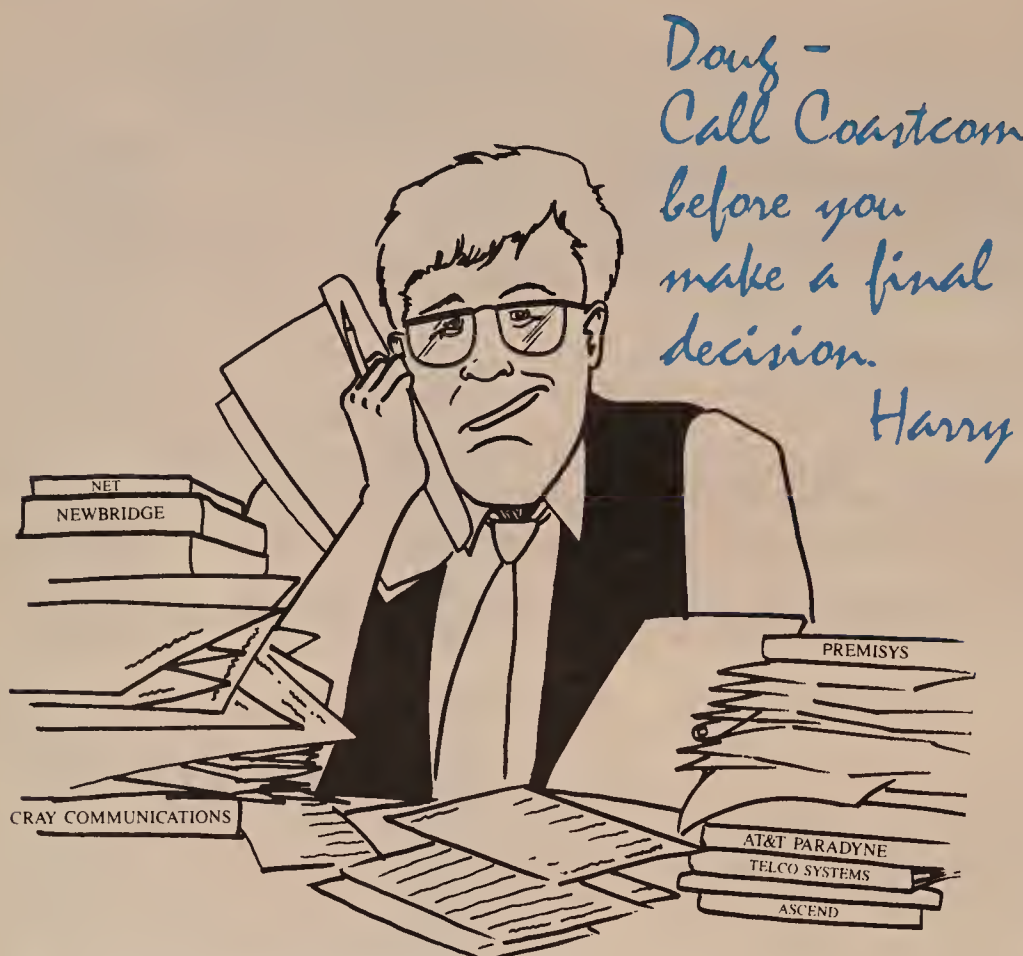
Land-line

Corporate site

V.42  
MNP-2 to MNP-4  
Others

ETC  
MNP-10  
Others

GRAPHIC BY SUSAN J. CHAMPENY



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## SNMP

Continued from page 31

avoid being bothered with short outages.

Of the three to four daily alarms that do trigger a page, Sault said about 40% result in trouble tickets being opened with AT&T.

Analog Devices has been using SNMP to monitor its frame relay connections since it first set up the links with AT&T five to six months ago. The company had trouble with the service shortly after it came on board because AT&T changed the structure of its SNMP Management Information Base (MIB), causing the MIB to stop sending traps.

Those problems have since been resolved but could crop up again in the third quarter when AT&T plans to implement a new specification for an industry-standard MIB recently approved by the Frame Relay Forum (NW, June 6, page 9).

The forum's MIB includes support for enabling and disabling PVCs on-line, rather than through a phone call to a carrier. Sault looks forward to on-line PVC changes but first wants to see added security, such as the encrypted passwords provided for in SNMP Version 2.

Sault would also like to see additional data available; right now, he can only check if a port or PVC is up or down. For example, he would like to be able to get reports on outages that last for less than five minutes, while not being

bothered with alarms for those outages. Such a service would allow him to better monitor carrier performance, he said.

AT&T has had an SNMP service based on a proprietary MIB since July 1992. The carrier prices the service as a percentage of port charges — somewhere under 10%, the company said. Supported platforms include HP's Open View, IBM's NetView/6000 and SunSoft, Inc.'s SunNet Manager.

In addition to setting traps that trigger alarms, the service is also handy for testing, said Tania Volochine, an AT&T product manager for customer network management services. Frame relay links can carry traffic from multiple devices through a single port, and SNMP allows users to learn whether a particular line is overburdened, she said.

The service is not as well suited for long-term net planning. "Customers do not want to use SNMP information to decide whether they need to upgrade a PVC just based on hourly or a few hours' worth of data," Volochine explained. "They need...a longer term view of the data to be able to make capacity-type decisions."

For that kind of planning, AT&T offers a separate service that provides historical reports on global usage, which helps users decide whether to upgrade the committed information rate on a PVC, for example. ☐

## Comments?

See "Contacts" box on page 2.





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by Eric Paulak

## You want tariffs? Oh boy, do we got tariffs!

**T**alk about paperwork. There are more than 650 long-distance carriers and 1,500 local exchange carriers in the U.S., and,

according to a recent Supreme Court ruling, every one of them may soon have to file tariffs with the Federal Communications Commission for interstate services.

Here's why: In a victory for AT&T, the Supreme Court ruled that the FCC overstepped its bounds by setting up separate tariff filing requirements for dominant and nondominant carriers — with AT&T being the only dominant carrier. So now, if AT&T has to file tariffs, all carriers have to file tariffs.

On the plus side, this means you could have the rates available to you for every long-distance carrier, aggregator and reseller. That translates into a more informed decision and greater competition.

On the other hand, the paperwork and filing fee requirements could be the deciding fac-

tor that drives many smaller carriers out of business or keeps them from joining the foray.

Whichever scenario plays out — probably a combination of the two — the FCC has more on its plate than it can handle. And while the decision increases the requirements on small carriers, AT&T will most likely wind up with less stringent requirements as the FCC seeks a middle ground.

In addition, the FCC is sure to seek legislative help from Congress that will allow it to regulate AT&T differently than the other carriers. But for now, here's a glimpse at what the new tariff requirements will probably look like.

First, Sprint, LDDS/Metromedia Communications Corp. and other carriers actively signing negotiated deals will have to file their special arrangements as contract tariffs, just as AT&T is required to do and MCI chooses to do.

The time frame for filing tariffs will also change. Now, AT&T has to give 14 days notice for any proposed rate change; everyone else has a one-day notice requirement. With all its residential services, however, AT&T won't be given the one-day requirement — it's too short. So everyone will likely move to a seven-day notice period.

The idea of specific prices vs. rate bands is also up in the air. Currently, AT&T and MCI file exact prices for their services in their tariffs. WilTel, Cable & Wireless, all the competitive access providers and, sometimes, Sprint have rate bands in which they list the possible high and low cost of a service.

The same court that originally overturned the FCC's tariff policy the Supreme Court struck down is now considering a case against rate bands. Based on the court's decision, rate bands will likely become history because requiring exact prices from some carriers and rate bands from others creates two standards.

But there might be a reprieve from the same stringent tariff requirements being placed on small carriers, resellers and aggregators.

The Supreme Court went out of its way to say that the 40% of the market controlled by carriers other than AT&T represented too large of a percentage to let the FCC change the tariff filing requirements. But in "limited circumstances," the Court said the FCC was free to modify or waive tariff filing altogether.

So if the same tariff requirements were placed on AT&T, MCI, Sprint, LDDS/Metromedia, Cable & Wireless, Allnet Communications Services, Inc., LCI International, Inc., RCI Long Distance, LinTel Systems, Ltd. and WilTel, more than 98% of the market would be covered. That should leave a small enough percentage that those representing the 2% market share wouldn't have to file tariffs, or at least wouldn't have to follow the same standards.

With its pro-competition slant, look for the FCC to adopt a similar policy. It follows the Supreme Court's general intent without overburdening too many carriers or the FCC.

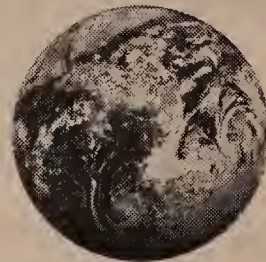
Whatever happens, the FCC has to act soon — it's not good to keep the high court waiting. Look for something in the next 30 to 90 days.

♦ Paulak is associate publisher for the Center for Communications Management Information, a provider of rate and tariff information in Rockville, Md. He can be reached at (301) 816-8950, Ext. 327.

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SWITCHED DIGITAL SERVICES



# CLIENT/SERVER APPLICATIONS

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## Lotus/SoftSwitch deal still on table despite stock drop

BY ADAM GAFFIN

Cambridge, Mass.

Lotus Development Corp.'s announced deal to buy messaging integrator SoftSwitch, Inc. is still on despite last week's dramatic decline in Lotus stock prices. Lotus spokesman Richard Eckel said it was too early to gauge the impact of the stock drop on the purchase, the value of which will be based on the average price of Lotus stock over a 25-day period before the deal closes sometime in August.

"I'm sure the topic has come up" in discussions between Lotus and SoftSwitch officials, but no decision has been made to alter the deal — originally valued at around \$70 million — Eckel said.

Lotus stock fell 28% last Tuesday after the company reported dramatically lower revenue projections for the second quarter of the year. The firm blamed sales problems with its desktop applications, but not its communications products and services.

Industry observers last week continued to debate the impact of the SoftSwitch buy, which will give

Lotus instant presence in the electronic mail integration market.

One thing they do agree on is that the move will mean better support and a brighter future for users of SoftSwitch technology, once the firm is folded into Lotus' new Inter-Enterprise Computing Group. SoftSwitch was unable to make much money, and some users reported problems getting support.

Gary Blum, principal at Rapport Communication, a Washington, D.C. consulting firm, said the deal could set off a chain reaction as Lotus rival Microsoft Corp. tries to move into the enterprise messaging market. But Blum said Microsoft will be unlikely to acquire switch technology as easily as Lotus did last week.

Microsoft may try to acquire smaller players, such as Boston Software Works, Inc. and Worldtalk Corp., but "there's always been only one SoftSwitch," he said. Another possibility might be closer alliances with Digital Equipment Corp. or Hewlett-Packard Co., which have their own switch software.

Blum said competitors will use the deal against SoftSwitch, claiming its new position as a Lotus entity means it can no longer be an independent vendor. Officials at both Boston Software and Worldtalk, which sell gateway technology for linking proprietary E-mail packages, made that argument last just week.

But David Whitten, vice president of the Office Information Systems service at the Gartner Group, Inc. consulting firm in Stamford, Conn., said he doubted this argument will hold.

He said Lotus is smart enough to let SoftSwitch continue giving equal development priority to non-Lotus software. Otherwise, it risks losing customers that now use SoftSwitch products to integrate E-mail packages from other vendors. ■

## ViP fills a front-end gap for Notes users

*New Lotus tool shows real promise as a graphical link to Notes databases.*

BY BARB COLE

Cambridge, Mass.

Lotus Development Corp.'s Notes Visual Programmer (ViP), expected to ship June 30, lets developers quickly build graphical front-end applications for Notes and may become a favorite with system administrators for its approach to distributing applications, ViP beta testers said.

With ViP, end users are not required to have a copy of ViP or even Notes on their desktops in order to run ViP client applications. In addition, Lotus is not charging run-time fees for ViP client applications.

"I can distribute ViP applications via electronic mail, and I can give them to 10 users or 900 users without paying run-time fees," said Bill Remmert, a systems integrator at Frederick Computers Plus in Frederick, Md.

Remmert said this approach is ideal for distributing views of Notes data in graphical format as a self-extracting "executable" to end users.

ViP is designed to allow developers to build front-end applications that access Notes, or to put a graphical face on Notes itself. It was described by beta testers as the Microsoft Visual Basic for Lotus Notes for its relative ease of use, its ability to access more

than a dozen data sources via Microsoft's Open Database Connectivity (ODBC), and its underlying scripting language (Lotus Script 2.0) for building complex applications.

"ViP lets you combine Notes data with relational data and easily generate graphs and reports based on that data, but the programming environment is robust enough to put together fairly sophisticated applications," according to Jeff Held, partner in the technology service practice at Ernst & Young in New York.

ViP runs on Windows and, via ODBC, can access databases including Informix, Oracle, Sybase SQL Server and Microsoft SQL Server. Also, it can access ASCII files as well as Lotus 1-2-3 and Microsoft Excel spreadsheet files.

"The fact that you can deal with multiple databases at the same time is nice for building executive information systems," said Paul Hantla, president of Corporate Solutions, a Notes value-added reseller in Oklahoma City.

Beta testers were enthusiastic about the graphing and reporting capabilities in ViP. "ViP pulls out information that would be in

a column-type view in Notes and displays it graphically. That's something you can't do in a straight Notes environment," Remmert added.

While the reactions of ViP beta testers were mostly positive, there were some complaints. Testers said more complex, 3-D-style graphs are needed in order to support executive information systems. Also, performance was slow compared to other graphical front ends, said Kelly Gillespie, owner of Client/Server International, a systems integrator in San Diego.

### ViP overview

#### Pros

- Can combine Notes data with more than a dozen data sources.
- Do not need ViP or Notes on desktop to run ViP application.

#### Cons

- Cannot launch a ViP application within a Notes desktop.
- May seem slow compared to other front ends.

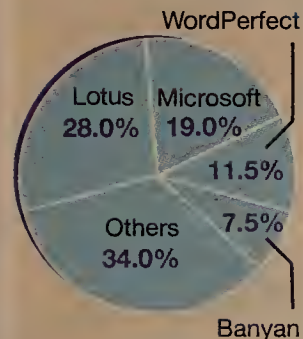
Another user said it was a drawback that users cannot launch a ViP application from within their Notes desktop.

"ViP gives us the graphical tool set and scripting language that will likely become part of Notes 4.0," Remmert said.

©Lotus: (617) 577-8500.

### Slicing up E-mail

1993 share of LAN E-mail market:



SOURCE: GARTNER GROUP, STAMFORD, CONN.

Culture is often underestimated and underappreciated in terms of its effect on solution viability and success."



Mike Sinneck  
IBM Consulting Group

## User report examines keys to client/server

BY ADAM GAFFIN

White Plains, N.Y.

When Metropolitan Life Property and Casualty Co. developed a client/server application for assessing the risk potential of new customers, it involved underwriters — the people who would actually use the system — from the beginning.

It sounds like a simple thing, but end-user involvement is one key to the successful implementation of client/server applications, according to a year-long study of 24 firms with client/server projects that was released recently by the IBM Consulting Group.

The IBM unit found that client/server applications

See IBM study, page 39

### BRIEFS

**Iona Technologies, Ltd.** of Dublin, Ireland, said last week that it had begun shipping beta copies of its Orbix 1.2 object request broker (ORB) for Windows.

Orbix, designed for **distributed object computing** applications, lets objects and object-oriented applications talk to each other across a heterogeneous network.

Iona is already shipping ORBs for Windows NT and Unix platforms and is working with Sun Microsystems, Inc. to develop a communications channel between Orbix and Sun's Distributed Objects Everywhere technology.

Sun recently bought a share of the company.

Orbix for Window is scheduled to ship by September, with a developers' tool kit starting at \$599.

Iona: (800) 672-4948.

**Moore Corporation, Ltd.** of Toronto recently acquired a 20% stake in **electronic forms** vendor **JetForm Corp.** of Waltham, Mass.

Moore, best known for selling

paper forms, said it will work with JetForm to provide a migration path for customers seeking to move their forms on-line.

Under the terms of the \$20 million purchase, Moore has the right to buy up to 51% of JetForm over the next five years.

JetForm: (617) 647-7700; Moore: (416) 364-2600.

**Wingra Technologies, Inc.** of Madison, Wis., last week announced software to connect its Missive messaging integration hub with Microsoft Corp.'s Microsoft Mail.

Missive provides connectivity between local network **electronic mail** systems and legacy, host-based E-mail systems.

The Missive channel for Microsoft Mail is scheduled for release in the fourth quarter, with pricing starting at \$3,000.

The company also announced plans to connect Microsoft's planned Exchange messaging server to Missive.

Wingra: (608) 238-4454.



# \$1,000,000,000,000 and What Did We Get?

BY SCOTT MCCREADY

International Data Corporation/Avante

Ten years and a trillion dollars spent on information technology (IT) and what did we get? According to numerous sources and the respected economist Lester Thurow, the answer is very little in productivity terms. In fact, the Nobel Laureate is on record as claiming that IT spending has done nothing to change the productivity of the work place! Yet, intuitively, most of us believe the contrary. Perhaps the way we measure productivity is open for discussion, or even the very definition of productivity has changed over the period being measured? However, no matter what nuances we wish to introduce to the discussion of the growth in work output, it is clear that our past IT investments have not delivered the kind of returns that we expected.

Given the evidence so far, one might question why worldwide spending on IT continues at an annual level of \$380 billion, consuming 1.5% of GDP worldwide and 2.3% of the GDP in the US. This level of spending is comparable to the average IS professional shelling-out \$300 a month on Vitamins. While there is proof that vitamins can benefit your physical health and there is some preliminary evidence that IT spending can positively impact the financial health of a corporation, neither party has the overwhelming data necessary to justify these excessive consumption practices. As a result the pressure will grow tremendously for IT professionals to demonstrate the positive financial implications of all new technology. In anticipation of the ROI trend, IDC elected to invest significant resources to produce a landmark study on the financial impact of employing new technology.

This study, to evaluate the financial implications of Lotus Notes at 65 customer sites worldwide, began in Windsor, Connecticut and concluded less than 50 miles from the border of Estonia. Sitting in a company cafeteria with two executives who had flown down from Lapland, we watched the snow fall against the backdrop of dense Fir trees. One of the Finnish executives mused, "Perhaps it is because we have a little longer to think without interruptions in Lapland, but we see Lotus Notes as an 'agent of change.' Change in the way you develop applications, change in the way people communicate, change in the way

people work together, and finally change in the way that people view the role of automation. In effect, Notes has the power to transform a company and the people who work for it."

We had started this project with a simple goal: interview Lotus Notes customers and determine their return on investment (ROI). We found that the financial returns are simply staggering. The return on investment for Notes applications ranged from 16% to an incredible 1,666%.

However the financial results only tell a portion of the story. It is the combination of financial benefits with the uniform embrace of change that clearly suggests there is something significant behind the Notes phenomena.

**It is the combination of financial benefits with the uniform embrace of change that clearly suggests there is something significant behind the Notes phenomena.**

This ROI study is important because, as IT spending tops \$380 billion worldwide, a growing number of voices can be heard asking, "where is the pay-off?" We believe that past IT investments have paid off and

our study on Notes clearly points out where the productivity benefits are, as well as providing a clear path to higher levels of efficiency. This study is a start, but IS professionals are going to need more ammunition in the future if they are going to be able to acquire new technologies such as imaging, electronic

mail, forms software, work flow software, document management, etc. These are the technologies that, in combination with products such as Notes will drive a new revolution in white collar productivity.

You can join this revolution by signing up for *Work Management '94* today and immediately receiving your complimentary copy of our Lotus Notes study. Alternatively, you can prepare to fend off the hordes who think slashing IS costs and re-engineering the corporation in combination with a complimentary outsourcing strategy is the way to go. We have the evidence and the tactics and strategies to prove the contrary, so join us on September 28-30 and get your complimentary copy of the Lotus Notes study by registering today.



Scott McCready is a principal with IDC/Avante Technologies, a market research firm in Framingham, MA that specializes in providing expertise on workflow, imaging, and related technologies to vendors and IT customers. The company recently completed a landmark study *Lotus Notes - Agent of Change: The Financial Impact of Notes on Business*.

## DON'T MISS THE BUSINESS PROCESS AUTOMATION EVENT OF THE YEAR!



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- Effectively address the issue of white collar productivity
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CORPORATION

**WANG**

**To register or for more information, call (508) 935-4100**

**REGISTER TODAY!**  
First 100 paid registrants will receive a FREE copy of the Management Summary from IDC/Avante's Lotus Notes: Agent of Change report (a \$495 value)



# PC Networking's New Dimensions

## Hewlett-Packard's Perspective



**NETWORKING: TODAY'S IMPERATIVE/5 • SERVERS CATCH THE PCI BUS/6 • NEW SOLUTIONS FOR REMOTE  
SERVER MANAGEMENT/6 • STANDARDIZATION COMES TO MULTIPROCESSING/7 • FREEDOM OF THE (NETWORKED  
PRINTING) PRESS/9 • REMOTE COMPONENT MANAGEMENT THROUGH DMI/12 • IMPROVING PERFORMANCE  
WITH INTEGRATED 32-BIT NETWORKING/12 • THE CLEVELAND INDIANS BUILD A DIGITAL DATA WARPATH/13  
A STACKABLE ARCHITECTURE FOR AN OPEN NETWORK FUTURE/16 • MAKING FAST ETHERNET REAL/16**









**HP NetServer LM** • 90- and 66-MHz Intel Pentium™ processor, 66-MHz Intel486™ DX2 processor • Dual Intel Pentium 66-MHz Symmetric Multiprocessing (SMP) • Optional internal hot swap disk array (RAID 0, 1, 5, 6) and ECC memory • HP NetServer Assistant 2.0 included • 16-MB RAM standard, 384-MB maximum • Up to 256-KB write-back cache • 9 mass storage shelves • 8 EISA bus-master I/O slots • Integrated EISA Fast SCSI-2, IDE and video controllers

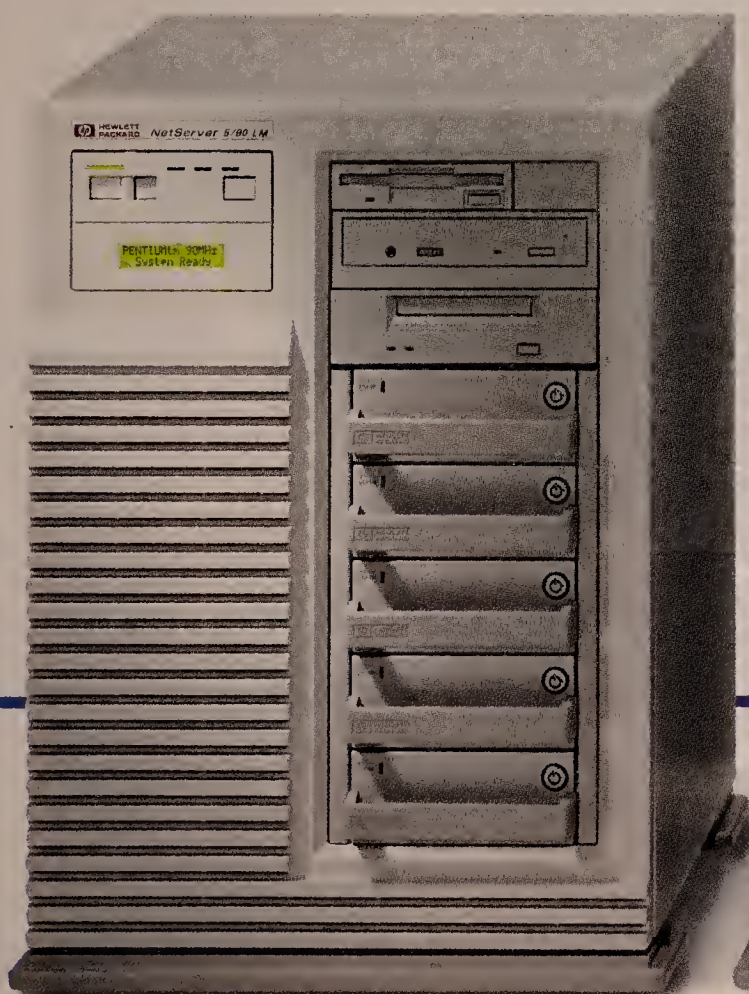
• Designed-in security, serviceability, and cooling features • Tested and certified on all major network operating systems

**HP NetServer LF** • 66-MHz Intel Pentium processor, 100-MHz IntelDX4 processor, 66-MHz Intel486 DX2 processor • Automatic Server Restart • HP NetServer Assistant 2.0 included • Optional internal hot swap disk array (RAID 0, 1, 5, 6) • 8-MB and 16-MB RAM standard, 192-MB maximum • 256-KB write-back cache • 9 mass storage shelves • 2 PCI, 7 EISA bus-master I/O slots • Integrated EISA Fast SCSI-2, IDE and video controllers • Designed-in security, serviceability, and cooling features • Tested and certified on all major network operating systems

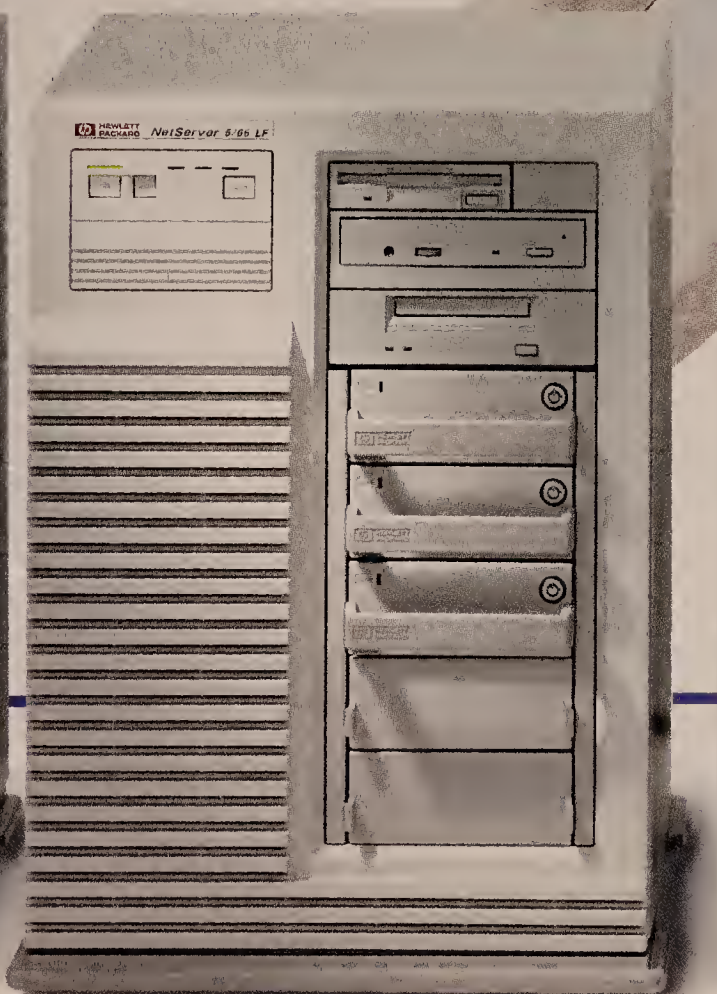
**HP NetServer LC** • 66-MHz Intel Pentium processor, 100-MHz IntelDX4 processor, 66-MHz Intel486 DX2 processor • Automatic Server Restart • 8-MB and 16-MB RAM standard, 192-MB maximum • Up to 256-KB write-back cache • 1 PCI, 1 PCI/EISA-combo, 4 EISA I/O slots • 5 mass storage shelves • Integrated EISA Fast SCSI-2, IDE and video controllers • Designed-in security, serviceability, and cooling features • Tested and certified on all major network operating systems

**Management Solutions: HP Remote Assistant** • \$999† for intelligent EISA card and software • Complete remote control of server • Continual environmental and server hardware monitoring and error logging • Automatic Server Restart • Works on all major network management environments **HP NetServer Assistant 2.0** • Included with HP NetServer LM and LF; \$495† option for HP NetServer LC • A customizable server management software tool set • Proactive system/component alerting and status information • Includes HP OpenView 7.1 • Comprehensive troubleshooting tools

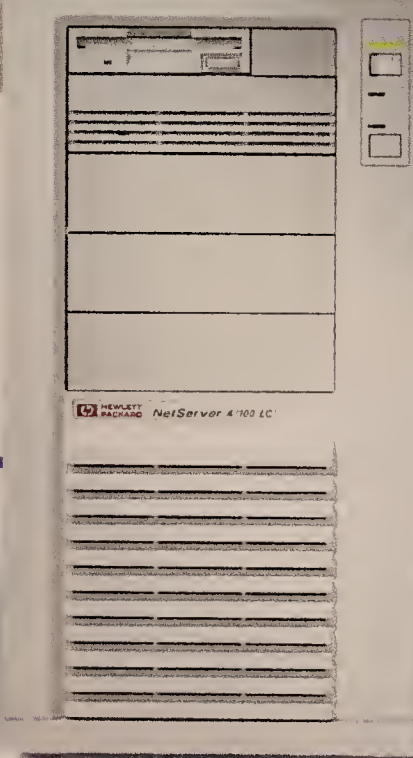
**HP Service and Support** • A full range of support service from HP or HP-authorized resellers • Three-year, on-site, next-business-day limited warranty standard on all products; affordable upgrades to same-business-day or 24-hour, 7-day, 4-hour response • Complete technical and support information available through a wide range of media: HP Support Assistant CD-ROM subscription; fax-back service; BBS; CompuServe forum and telephone support



**HP NetServer LM \$4,449\***



**HP NetServer LF \$3,249\*\***



**HP NetServer LC \$2,529\*\*\***



# Now you can be everywhere at once. Without going anywhere.

## HP NetServers are easy to manage even when you're not there.

With today's increasingly complex networks, it seems LAN managers depend more on their beepers and the corporate travel office than anything else. Go here, go there, fix this, fix that. Leaving no time for the kind of proactive work that could avert trouble in the first place.

Maybe that's why so many network administrators are turning to the affordably priced lineup of HP NetServers. Take a quick look, and you'll find optimized price/performance servers to match every need. But you'll also discover how to answer your need for servers that are easier to manage.

HP NetServer Assistant software helps you prevent problems before they occur—and gives you tools to resolve them if they do. And because it supports the HP OpenView platform, you can access your entire network from a single console. With HP Remote Assistant, you can manage the server from anywhere, even if it's down. Even if the network's down.

Performance? You can choose from single

and dual Pentium™ models, as well as those with Intel486™ DX2 and DX4 processors. For compute-intensive applications, you'll want to look at the HP dual Pentium Symmetric Multiprocessing model. Whatever you select, you'll enjoy maximized uptime, thanks to RAID-based fault tolerance, hot swappable drive replacement and error checking and correcting memory.

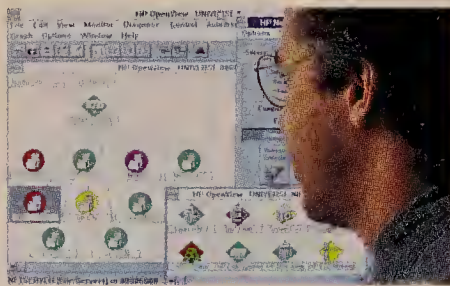
Perhaps best of all, HP NetServers come to you from the company with an unparalleled reputation for quality, reliability and sup-

port—Hewlett-Packard. Which is undoubtedly why we can offer one of the industry's best warranties: three-year, next-business-day, on-site delivered by HP or your reseller.

For more information on HP NetServers, call us

today at 1-800-533-1333, Ext. 8439. And the next time you feel a need to go somewhere, make it a vacation.

Another smart networking product from HP.



With HP NetServer Assistant 2.0, you get intuitive viewing of your network, comprehensive diagnostics, plus local and remote management, all in one package.



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PACKARD**

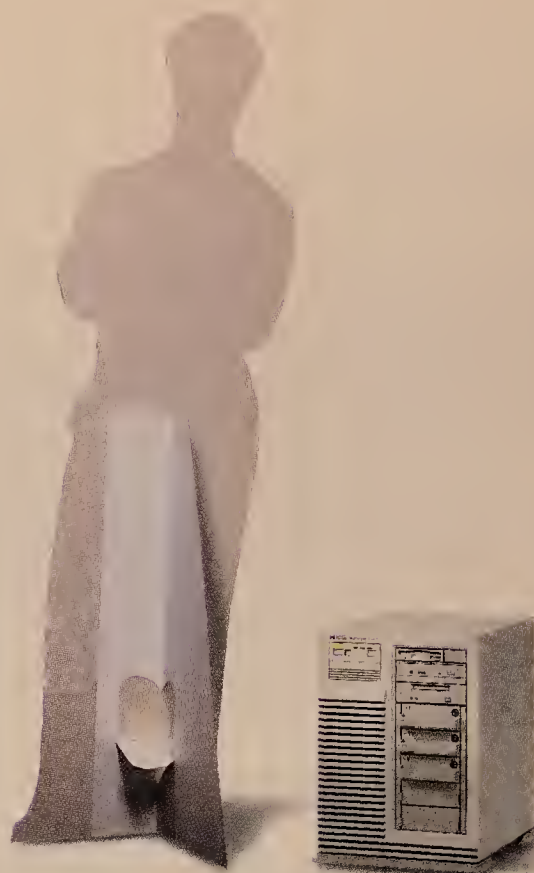




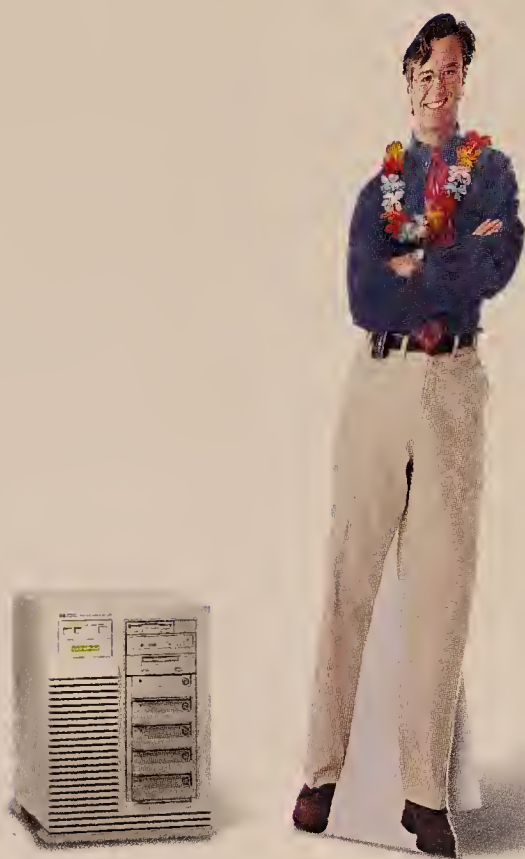




*Monitor disk space down the hall.*



*Check error logs and diagnose your server across campus.*



*Power cycle the server in Kalamazoo.*



*Open a window on the world.*



For more information on  
HP's PC networking  
products, complete the  
business reply card next  
to Page 17.







*What's missing is a unifying strategy, an organizing principle for all of the technological developments in PC networking, ensuring that the four major challenges are being met not just on paper, but with real products that resolve thorny networking issues in the real world*

# Networking: Today's Imperative

**A**s networks evolve toward the ideal of providing high-speed access to any kind of information, at any time, in any location, the role of PC LANs has been evolving to keep pace. Four major trends are evident: PC LANs today are becoming larger, more capable, and more complex. More mission-critical applications are migrating to PC LANs. The cost of managing these LANs is increasing. And the demand for multimedia, which has hovered on the technological horizon for a couple of years, is beginning to be a factor in network design.

The challenges are clear. The responses of many PC networking providers, however, seem scattered. They present the market with a series of disconnected tactics, addressing only individual elements of the problem: more standardization to reduce complexity; more performance for mission-critical applications; more recognition for manageability as an issue; and more talk, with few specifics, about multimedia.

What's missing is a unifying strategy, an organizing principle for all of the technological developments in PC networking, ensuring that the four major challenges are being met not just on paper, but with real products that resolve thorny networking issues in the real world.

Hewlett-Packard provides that unifying strategy by helping network managers meet the four challenges of managing complexity, improving performance, reducing cost, and enabling multimedia *while satisfying today's imperative to extend and evolve existing networks.*

This recognition—that all improvements have to occur in the context of a company's existing investment in strategic networking systems—is a key element of HP's strategic vision, one that is shared by HP authorized value-added resellers.

The following articles describe some of the newest and most promising developments in PC networking: a new stackable architecture that offers users new flexible, distributable performance; 100VG-AnyLAN, which will provide a tenfold improvement in performance of either Ethernet or Token Ring networks without costly software or wiring changes; a new standard for multiprocessing that will help users of servers and PCs more easily reap the benefits of this high-performance technology.

Even as isolated innovations, these are exciting. But they are more compelling as examples of a unified vision. They illustrate HP's determination that networks be easy to extend to meet new demands for performance and capacity, and that they conform to relevant industry standards. They highlight HP's goal that networks be easy to evolve to meet constantly changing needs. And they confirm HP's strategy to embrace today's imperative. ●



**Richard C. Watts**

*Richard C. Watts  
Vice President and General Manager  
Personal Information Products Group  
Hewlett-Packard*



Manage Everywhere

From Anywhere



*PCI's bandwidth and throughput capabilities—  
together with its processor-independence,  
extensibility, and compatibility with  
other buses—will soon make it a common bus  
architecture for PC servers*

## Servers Catch the PCI Bus

**D**riven by the requirements of compute-intensive applications and higher server performance, a new local bus architecture is entering the commercial mainstream. Called the Peripheral Component Interconnect (PCI), this new architecture remedies the shortcomings of other buses in today's computing environment, where

advances in hardware performance are almost immediately consumed by the demands of ever more complex applications. PCI's bandwidth and throughput capabilities, together with its processor-independence, extensibility, and compatibility with other buses will soon make it a common bus architecture for PC servers.

### THE ADVANTAGES OF PCI

PCI was developed by Intel Corp. to fill two roles. On the desktop, it is a processor-independent bridge between high-speed peripherals and the CPU. In servers, it is used to accommodate traffic between these peripherals and main memory. Although Intel originated PCI, the company does not control it. In 1992, a group of companies formed a special interest group to manage the specification.

PCI brings four advantages to today's computing environment.

The first is performance. It is 32 bits wide, which yields a peak

bandwidth of 133 megabytes per second (MBps) when running at 33 MHz.

The second is compatibility. PCI works with ISA, EISA, and MCA buses. Initially, PCI machines will have a combination of buses due to the natural dynamics of a market in transition. But there will always be a need for lower-performance buses to handle tasks where PCI's performance would be wasted (e.g., modems and parallel and serial ports), so compatibility will be an ongoing requirement.

The third is processor independence. The PCI specification has an intermediate buffer between the CPU and peripherals designed to isolate changes in processor technology from bus design so 486, Pentium™, PowerPC™, and other CISC and RISC processors will all work with PCI.

Which yields the fourth major advantage: PCI has several characteristics that allow it to provide performance benefits even in the face of significant future changes. Processor independence decouples bus and processor design. Extensibility lets PCI support a multiplexed 64-bit data and address bus, a requirement for the next generation of high-performance peripherals. This extension of its existing 32-bit data and address bus doubles the system's peak bandwidth to 264 MBps. Transparency, provided by a connector that accepts 32-bit and 64-bit cards, insulates the user from the details of communications between 32-bit and 64-bit peripherals. And auto-configuration lets users install PCI boards without having to manually configure jumpers, DIP switches, or interrupts.

## New Solutions for Remote Server Management

**E**ver since companies began to rely on local area networks, LANs and servers have relied on each other to work well. Remote server management has therefore joined network management as a crucial capability for most companies. The two major advantages of remote management are maximized uptime and reduced cost. To achieve the same uptime with 24-hour local server management—the only other practical alternative—is expensive. “Lights out” server management—on-site management during business hours, and support from a remote operations center the rest of the day—is cost-effective and allows companies to consolidate their support staffs in one location, which enables additional savings.

IS executives today require the same kind of sophisticated remote management capability for PC servers that HP has spent decades developing for its large-scale systems. They want server management products that integrate seamlessly with enterprise management solutions. And above all, they want products to help them recover from serious server failure.

HP NetServer Assistant and HP Remote Assistant meet these demands. HP NetServer Assistant is software designed to give users the tools necessary to remotely manage the server in every situation except if the server is no longer running MS-DOS®. If the server has failed, but is running DOS, then HP NetServer Assistant can be used to notify administrators, allow them to dial in and remotely diagnose the problem, and recover operation of the server. HP Remote Assistant can be used in all failure modes. It is a battery-powered card that will either restart the server automatically or allow the administrator to dial in and recover server operation, even if the network is down.

Together, these two products bring large-system management capability to PC servers for the first time. They integrate with all three major management platforms. And they give system administrators a tool to restore operations even when both the network operating system and the server have gone seriously wrong. ●



## PCI IN THE SERVER

In servers, PCI offers the paramount advantage of high performance.

Because PCI provides low-latency, high-bandwidth paths for access to PCI devices and main memory, it can support the kind of data transfer necessary for today's applications. A PCI server provides high-performance connections to 1) high-speed networking systems such as 100VG-AnyLAN and ATM, and 2) high-bandwidth, multi-channel disk array controllers.

### *Designers using PCI can integrate the functionality of multiple LAN connections onto one physical card*

While EISA will continue to be a player in the server arena because of better driver and peripheral support, PCI offers some significant advantages. One of these is cost-efficiency. EISA has separate data and address pins, while PCI uses the same pins for both, thus reducing the overall size and cost of the IC package. And designers using PCI can integrate the functionality of multiple LAN connections onto one physical card. This gives users the benefit of using only one system connection to obtain multiple connections to the network.

HP has already implemented PCI on its HP NetServer LF and the new HP NetServer LC. Other PCI servers will follow according to customer requirements.

## OPTIMUM

Hewlett-Packard's strategy with PCI is to give users the optimum combination of price and performance in servers. And it can also include cost-effective access to standard peripherals, giving users a cost-effective solution overall, with high-performance PCI bandwidth where they need it most. ●

*For data sheets on the HP NetServer LF, the HP NetServer LC, and a whitepaper on PCI, call 1-800-296-5810, ext. 200, or check PCI on the business reply card.*

# Standardization Comes to Multiprocessing

**T**echnical obstacles have received a lot of the blame for slowing the quest for an affordable multiprocessing server. Cache coherency, bus contention, scalability, and a host of other thorny problems have all challenged system designers. But another challenge, one with both technical and political elements, must also be met before multiprocessing enters the mainstream: standardization.

Until now, the multiprocessing market has been a market without standards, where every vendor implementation was different from every other. There is no common method for the operating system to communicate with the multiprocessing hardware. The net result is terrible inefficiencies for hardware and software vendors, high costs for users, and a situation where the dream of a multivendor multiprocessing environment was impossible to realize.

## THE MULTIPROCESSING SPECIFICATION

Today a group of vendors, including Hewlett-Packard and Intel, are spearheading an effort to create a de facto standard for multiprocessing called the multiprocessing specification (MP Spec) Version 1.1. Hewlett-Packard is one of the first vendors in the industry that has systems (the HP NetServer LM2 and the HP Vectra XU PC) supporting this new standard for multiprocessing systems designs based on Intel processors.

The benefits of the MP Spec standard are analogous to the benefit of the uniprocessor standard for both applications and operating systems. Just as the PC specification does in the PC market, the MP Spec will let software developers write multiprocessing applications to a uniform standard. And, again as in the uni-

processor market, the MP Spec will let users buy shrink-wrapped multiprocessing operating systems and run

them. There must be multiprocessing applications written from the ground up to incorporate "multithreading," the

### *Every vendor implementation was different from every other*

them out of the box. (Users will also be able to run all existing uniprocessing applications on their MP systems unchanged.) As a result, users will be able to reap the benefits of powerful multiprocessing engines without having to worry, as they do today, about the myriad pitfalls of system configuration, performance, optimization, and interoperability.

Vendors are expected to embrace MP Spec because Intel is providing MP-ready components, which will make the development of cost-effective systems much quicker. A good example is APIC, Intel's Advanced Programmable Interrupt Controller. A major component of the MP Spec that handles I/O interrupts for multiprocessing, APIC is built into Intel Pentium™ 90 MHz and 100 MHz processors. MP Spec will also let operating system vendors quickly support a wide range of platforms with one MP OS product and one standard OS driver.

Hewlett-Packard is among the leaders in implementing the MP Spec. The HP NetServer 5/66 LM2 is a symmetric multiprocessing server that runs SCO MPX, Windows NTAS, and IBM OS/2® SMP.

## MULTIPROCESSING GETS REAL

For multiprocessing to be a viable mainstream strategy requires three preconditions. There must be multiprocessing hardware, which already exists: HP's NetServer LM2, a multiprocessing application server, and the HP Vectra XU PC, a high-performance technical and business personal computer, are good exam-

ples. There must be multiprocessing applications written from the ground up to incorporate "multithreading," the ability to break up a given problem into many fragments, called "threads," and process them in parallel. Few multiprocessing applications yet exist. And there must be multiprocessing operating systems.

Here the picture is less black-and-white. The crucial characteristic is whether and how well operating systems support multithreading, which sometimes defies unambiguous pronouncements. Windows NTAS SMP, SCO MPX, IBM OS/2® SMP, and the proposed Novell NetWare™ MP, are all "fairly strong" in multithreading, but in ways that may or may not be quite different from each other—that are not standardized.

## BENEFITS OF STANDARDIZATION

This is one of the areas in which the MP Spec will have a tremendous positive impact. Standardization will make the evaluation of the multiprocessing and multithreading capabilities of different applications and operating systems much simpler. It will allow every group with an interest in multiprocessing systems to benefit from lower costs and increased interoperability. And it will free vendor resources to concentrate on much higher levels of functionality and performance. ●

*For data sheets on the HP NetServer LM2 and the HP Vectra XU PC, call 1-800-296-5810, ext. 200, or check MP Spec on the business reply card.*



# Made to be ignored.

## Network-ready HP LaserJet printers for your LAN.

Much to be done. And precious little time to do it. Why allow network and end-user snags to distract you from the more important things?

The new, network-ready HP LaserJet 4M Plus and the HP LaserJet 4Si MX printers work in all the most popular network environments. Direct-connect right out of the box with the built-in HP JetDirect network interface card. And move between network operating systems without firmware upgrades.

The primary benefit to users is, of course, faster job completion time. Network-ready HP LaserJet printers bypass parallel-port bottlenecks.

Maximize data-transfer speed. Provide bi-directional communication. And reduce the load on your file servers.

Other user benefits abound. Automatic switching between languages, I/Os and operating systems. Adobe™ PostScript™ Level 2 software built in. And versatile paper-handling capabilities.

Consider all this, along with legendary LaserJet reliability and HP's superior service and support, and there's really no question. Call 1-800-LASERJET, Ext. 8246 for more information.\*

Give your users network-ready HP LaserJet printers. Let them take care of themselves. Then walk away with confidence.

You do your job. We'll do ours.  
**HP LaserJet Printers**





# Freedom of the (Networked Printing) Press

In 1920, A. J. Liebling wrote that "Freedom of the press belongs to those who own one." If he were alive today, he might have added: "And not necessarily to those who have to use one over a network."

This may be true for many kinds of networked printing. But Hewlett-Packard has developed a strategy to make the clearcut goals of reliability, flexibility of location, performance, interoperability, and manageability simple to achieve in heterogeneous networked environments: to make network printing as easy and productive as local printing.

## A SUCCESSFUL NETWORK PRINTING STRATEGY

The fundamental building blocks of a successful network printing strategy are reliability and location flexibility. If network printers are not reliable, and if they cannot be placed near the people who use them most, then all the other benefits are superfluous. HP has built its network printing reputation on LaserJet and DeskJet printers that deliver solid, excellent performance over and over again. And the company has made it possible for network managers to place these reliable printers wherever they're needed: either connected through systems, or directly to the network using the HP JetDirect family of print servers.

One step up from these foundation elements for network printing are the requirements for perfor-

mance, interoperability, usability, and manageability.

HP addresses the performance issue by making it possible to connect printers directly to networks, thereby ensuring that printing occurs at network speed. HP printers, which are typically shared, have a modular I/O (MIO) expansion slot that accommodates JetDirect internal print servers for different operating systems. Having shared the MIO specification with its strategic partners, HP now has solutions for more than 95 percent of the network environments in use today.

Interoperability—the ability to print from anywhere to anywhere without regard for cable types, language, or NOS—is becoming a necessity in today's heterogeneous installations. In addition to the fact that HP's printers are network-ready printers and may have multiple interface cards, they have a number of automated features for interoperability. Automatic I/O, language, and network switching lets printers switch among I/O ports, page-description languages, and protocols/NOSs without user intervention.

For enhanced usability, HP has provided built-in intelligence and powerful utilities for its printers. Through HP Admin and HP JetPrint printer management utilities, users can get everything from remote configuration and front-panel viewing, to real-time status reports and point-and-click printing to the most convenient printer,

to remote diagnostics and troubleshooting.

These last capabilities are really a part of manageability, an area administrators find increasingly important. Network printing, which was initially developed to save money and effort, can end up costing organizations if it is

Desktop Management Interface (DMI), to automate the management process as much as possible and reduce the incidence of these problems.

## PRINTING PRODUCTIVITY

HP's fostering of seamless compatibility across networks, support

*HP has developed a strategy that makes network printing as easy and productive as local printing*

not easy to manage. A person who sends an important 15-page document to a printer can easily discover the many ways this seemingly straightforward process can become complex:

- Half the document is missing because the printer ran out of paper;
- The document is printed on letterhead from the wrong paper tray;
- The text is faint because toner was low;
- The document is now 100 pages long because the printer did not have the right page-description language.

And so on. When these events occur frequently, network printing does not save money; it becomes a drag on time, user productivity, and support resources. Hewlett-Packard's network printing strategy is designed to develop a set of powerful management tools, based on the Simple Network Management Protocol (SNMP) and the

of industry-standard management systems, and ability to provide bi-directional communications capability with network printers make management much easier and more effective. When combined with the other elements of HP's network printing strategy, these capabilities can transform a large part of a LAN manager's job. Without HP's network printing capabilities, LAN managers tend to spend a lot of time on crisis management. With these capabilities, they tend to spend more time on making networks—and network printing—much more productive. ●

*For more information on HP's network printing products and strategy, call 1-800-296-5810, ext. 200, or check Network Printing on the business reply card.*





# Look for us on all the major networks.

Word about PCs from Hewlett-Packard is getting around, and ratings are soaring. According to a recent CRN/Gallup survey, "Use of HP desktops in Fortune 1000 companies has doubled in the last year."<sup>+</sup>

And with good reason. Our broad range of PCs not only meets users' expectations for power and ease of use, it also answers the needs of a network manager. With built-in features like on-board networking, advanced security and asset tracking, HP PCs have what it takes to be top performers on virtually any network. And soon our expertise in network management will reach all the way to the desktop, as we continue to pioneer the development of DMI (Desktop Management Interface).

For more information or the name of your nearest HP dealer, call us today at 1-800-322-HPPC, Ext. 8324. And tune in to the network superstars.

## Give your other PCs something to look up to.

If you're connecting PCs to a network,  
scan this chart and you'll see it's time to hook up with HP.

STANDARD NETWORKING FEATURES	HP VECTRA M2 PC	COMPAQ DESKPRO/XE	DELL NETPLEX
Advanced Bus Architecture	VL-bus		
Integrated Networking Interface	16-bit		
Integrated, multiprotocol Boot-ROM	X		
ISA Plug-n-Play Compliant	X	X	
Multilevel Security Features	X	X	X
Asset tracking	X	X	
PC tattooing	X	X	
Optional Desktop Management Software	X		
Bi-directional parallel port	X	X	X
Desktop Management Interface (DMI) <sup>3</sup>	X		



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HP quality in  
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- Intel 486SX, 486DX2 and DX4
- Chip upgrades to higher performance
- On-board accelerated local-bus video
- 210-MB hard drive<sup>1</sup>
- 4-MB RAM, expandable to 64-MB
- 512-KB or 1-MB of Video RAM standard
- ISA Plug-n-Play compliant
- Desktop Power Management

High-performance  
network-ready PCs  
in a slimline package.

- Intel 25- and 33-MHz 486SX, 50- and 66-MHz 486DX2, upgradable to Pentium Overdrive
- Optional 128- or 256-KB second level cache
- 170-MB, 14-ms Fast-IDE hard drive
- 32-bit Fast-IDE local-bus hard disk interface
- 4- or 8-MB RAM, expandable to 96-MB
- Ultra VGA2 local-bus accelerated video supporting up to 1280 x 1024 resolution

High-performance  
PCs for the  
connected office

- Intel 33-MHz 486SX; 50- and 66-MHz 486DX2, 100-MHz DX4, upgradable to Pentium Overdrive
- Optional 128- or 256-KB second level cache
- Four mass storage shelves; four expansion slots
- One available 32-bit VL-bus slot
- 210-MB, 14-ms Fast-IDE hard drive
- 32-bit Fast-IDE local-bus hard disk interface
- 8-MB RAM, expandable to 96-MB

Top performance for  
experts in connected  
environments.

- Intel 60-MHz Pentium with 256-KB write-back cache
- One PCI slot, one shared PCI/ISA slot, two ISA slots
- Four mass storage shelves
- 270-MB Fast-IDE hard drive with 12-ms access time<sup>1</sup>
- Integrated S3 928PCI graphics accelerator
- 2 MB of VRAM expandable to 4 MB, 1600 x 1200 video resolution
- 8-MB RAM, expandable to 192-MB



HP Vectra VL2

- EPA Energy Star certified
- Local bus Fast-IDE hard disk interface\*
- 1280 x 1024 video resolution\*
- Optional 128- or 256-KB cache memory\*
- Free three-year limited warranty for parts and labor<sup>2</sup>



NEW!

HP Vectra N2

- 1 MB of video RAM standard, expandable to 2 MB
- Slimline package with two mass storage shelves and three ISA slots
- Optional integrated 10Base-T networking
- Multilevel security
- EPA Energy Star certified
- ISA Autoconfiguration utility (Plug-n-Play)
- Integrated Desktop Management Interface (DMI)<sup>3</sup>
- Free three-year limited warranty for parts and labor<sup>2</sup>



NEW!

HP Vectra M2

- Ultra VGA2 local-bus accelerated video supporting up to 1280 x 1024 resolution
- Optional integrated 10Base-T networking
- Systems Diagnostics Utility
- EPA Energy Star certified
- ISA Autoconfiguration utility (Plug-n-Play)
- Integrated Desktop Management Interface (DMI)<sup>3</sup>
- Free three-year limited warranty for parts and labor<sup>2</sup>



HP Vectra XP

- Integrated 16-bit 10Base-T networking interface with bus-master DMA
- Flash EPROM
- Systems Diagnostics Utility
- Power-on Self Test
- Multilevel security
- Asset tracking with non-erasable serial number and customizable PC tattooing
- Bi-directional parallel ports
- Free three-year limited warranty for parts and labor<sup>2</sup>

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from  
**\$1,309<sup>†</sup>**

from  
**\$1,679<sup>†</sup>**

from  
**\$3,559<sup>†</sup>**



All HP Vectra PCs come with MS-DOS® 6.2 and MS Windows for Workgroups 3.11 pre-installed; HP mouse and keyboard included. \*Feature included with some models. †List price, dealer prices may vary. Monitor not included. †Other capacities available. ‡First year on-site, 24-hour service. Second and third year return to dealer. ‡Available 9/1/94. †With permission CRN/Benchmark. MS-DOS is a U.S. registered trademark and Windows is a trademark of Microsoft Corporation. Pentium and the Intel Inside logo are U.S. trademarks of Intel Corporation. PPG403 ©1994 Hewlett-Packard Company



Manage Everywhere

From Anywhere



# Remote Component Management Through DMI

**A**fter evolving on paper for years, the Desktop Management Interface (DMI) specification is now taking tangible form in a line of high-performance PCs. Hewlett-Packard is developing three new HP Vectra models—the M2, N2, and XU—to be DMI-compliant. These PCs represent the first, and broadest, product line to conform to the new specification.

## A THREE-PART ARCHITECTURE

DMI is a set of APIs and related code that has been developed to create a common set of rules for managing PCs across a network. The particular benefit brought by DMI, and the reason behind the excitement concerning its development, is that the specification holds the

promise of allowing remote systems management down to the level of individual components.

Any code for component-level systems management in the PC market must enable management information from an enormous range of components to be used by management applications that cannot possibly be tailored to each of those components' idiosyncracies. DMI meets this challenge with a three-part architecture that enables three key functions. It has a common set of APIs, so that third parties can write management applications to a common interface, not a bewildering array of components. It provides a uniform component interface, so that component manufacturers can provide manage-

ment information in a completely standard format, and not have to worry about which management applications are most popular and what their requirements might be. And it has a service layer in between these two to coordinate and manage the traffic between applications and components.

DMI was developed by a consortium of eight companies (Hewlett-Packard, Digital, IBM, Intel, Microsoft, Novell, SunConnect, and SynOptics) called the Desktop Management Task Force, or DMTF. Hewlett-Packard became a charter member of DMTF and supports DMI for two reasons. First, the industry absolutely requires some kind of standardized specification for component-level management. And

second, the specification for DMI is completely open, is easy to implement, and does not require approval by any standards-making body. As a result, the barrier for entry, and for successful innovation, is low.

DMI can be implemented in several kinds of products: components like network interface cards, mass storage devices, printers, faxmodems, and video cards; applications such as spreadsheets, databases, and network management applications; and can work with the Simple Network Management Protocol (SNMP) and Common Management Over LCC (CMOL). In the future, DMI could easily be incorporated into all network operating system

*continued on page 17*

## Improving Performance with Integrated 32-Bit Networking

**O**ne strategy for enhancing network throughput essentially ignores the network side of the equation, and instead focuses on system internals. After all, looking at the communications process as a whole, if data gets *to* the network faster, it will go *through* the network faster as well.

Hewlett-Packard is among the first companies to implement this strategy in the PC market. By integrating a 32-bit Ethernet controller for the Peripheral Component Interconnect (PCI) bus onto the motherboards of its HP Vectra XU PCs, HP has given PC users a jump in performance on both sides of the networking interface.

## COMPETITIVE ADVANTAGES

The main reason for integrating 32-bit networking onto the motherboard is simplicity. Integration solves a number of compatibility problems, as well as obviating the entire issue of configuration; integrated 32-bit networking is completely preconfigured and ready to run.

The main reason for using PCI is, of course, performance. But that's not the only reason. PCI also offers compatibility, processor independence, and the ability to be "future-proof"—significant benefits in today's networking environments.

The performance advantage is impressive. With its 32-bit-wide

architecture running at 33 MHz, a PCI bus yields a peak bandwidth of 133 megabytes per second. At 10BaseT line speeds, that gives users an approximate jump of 10 percent in network performance for no additional network investment. But the HP Vectra XU PC will have PCI slots that allow users to add 100VG-AnyLAN PCI cards. At 100 megabits per second (Mbps), bus bandwidth is a significant limiting factor in overall network throughput, and a PCI bus offers a tremendous competitive edge. Users can expect a 1000% network throughput improvement with a 32-bit PCI 100VG-AnyLAN card versus a 10BaseT Ethernet card.

Integrated 32-bit Ethernet/PCI on

the motherboard also provides a compatibility advantage. PCI is unique in the local bus arena in that it works with existing ISA and EISA buses, thus helping IS managers gain a powerful performance increment, but still preserving their investment in these older bus technologies.

Added to this "bus independence" is processor independence. The PCI specification provides an intermediate buffer between the processor and the peripherals. This effectively decouples changes in processor design from the local bus specification, providing more flexibility and another means of investment preservation.

Finally, PCI is relatively impervious to future technological change. Future processor designs will run over PCI. The multiplexed 64-bit data and address bus required by the next generation of peripherals will be

*continued on page 17*





Manage Everywhere From Anywhere

*Thanks to the power of the new network, the Indians have been able to take the \$40 million concessions business back from contractors and bring it into their own organization*

# The Cleveland Indians Build a Digital Data Warpath

**T**o look at the salary structure of a major league baseball team is to enter a world that makes cost-accountants cry. Imagine running a company where the average salary of your employees is hovering around \$1.1 million a year, and you begin to get the picture. If money talks, baseball is one of the loudest businesses on earth.

On the field. But in the front office, where the nitty-gritty support functions of the National Pastime happen, it's a different story. Here the pressure to cut costs is ferocious, and baseball business people face a dilemma. How can they manage the enormous amounts of information generated during a six-month season without spending enormous amounts of money to do it?

## MORE CONNECTIONS, FEWER STAFF

The Cleveland Indians resolved that dilemma with a low-cost, high-performance network from Hewlett-Packard. When the city decided a few years ago that it was time for a new ballpark, the organization decided it was time to make their front office the most efficient in the major leagues. So they entered into a 12-month evaluation/design process to come up with an information system that would do four things: be a single sitewide data highway, support up to 700 client PCs in four widely dispersed business units, be manageable from one station anywhere on the network, and not incur the cost of a larger IS staff.

"At a bank with that many nodes, the IS staff would probably be between

20 and 30 people," says Michael Zoldan, the Indians' director of information systems. "We don't have that luxury." Zoldan says the Indians' IS staff has five people now. And thanks to the functionality and ease of use of HP systems, it will not have to grow.

During the evaluation/design process, Zoldan and the IS team winnowed all possible vendors down to Hewlett-Packard, IBM, and Compaq based on a single criterion: Would they be a long-term player in the market? From these prospects, they signed Hewlett-Packard "because they were head and shoulders above the others in three areas," Zoldan says. "First, they provided a complete solution that was simply not available from the other two vendors. Second, they had a strong relationship with Novell, and the ability to bring Novell in to help with the NOS whenever necessary. And third, they really took ownership of the entire project. From project meetings, to installation, through to post-installation evaluations, HP had a team of certified engineers here. No other vendor could do that."

HP's willingness to get involved in all aspects of the network project turned out to be crucial. The new stadium was a partnership between the public and private sectors, and was funded in part through the imposition of new taxes on tobacco and alcohol. Any slip up had the potential to bring the wrath of the public (and of tax-averse politicians) right down onto the heads of the Indians' IS department.

"We were under a microscope," Zoldan says. "But HP took it upon themselves to make this network a

showcase. They said they wanted to make it the finest solution available, and it is."

What the Indians wanted was a single data superhighway—a digital warpath, if you will—that would use 10BaseT Ethernet running over fiber optic cabling to link up to 700 client PCs in four separate, geographically dispersed business entities. These included a 42,000-seat ballpark in Cleveland, an adjacent four-story office building, two remote sites in other parts of Ohio, and the entire spring training facility in Winter Haven, Florida.

## A \$40 MILLION BENEFIT

The Indians are one of a new breed of corporation that will run its operations entirely on PC-based systems. Topologically, the network that connects these systems is 28 star subnets, segmented with HP hubs and connected to remote sites with the HP Router RB for wide-area connectivity. Logically, however, it is a single network that connects all desktop PCs, 20 HP NetServer LM servers, and a total disk-farm of 30 gigabytes. The benefits the new network has brought to the organization are staggering.

First, the IS department's staff will stay the same size despite a radical increase in the amount of automation. This is a result of network management utilities from Intel and Novell, the remote manageability and ease of use built into HP equipment, and the power of HP's OpenView network management platform. "We have a tightly integrated network management system," Zoldan says, "which allows us

to keep the net running efficiently without increasing staff."

Second, the entire organization's permanent staff is 20 percent smaller than it otherwise would have been because the cash accounting systems—which used to be variations on the "left pocket income, right pocket change" system—have all been automated and networked to the central office.

And third, thanks to the information management power and visibility provided by the network, the Indians have been able to take the concessions business back from contractors and bring it into their own organization.

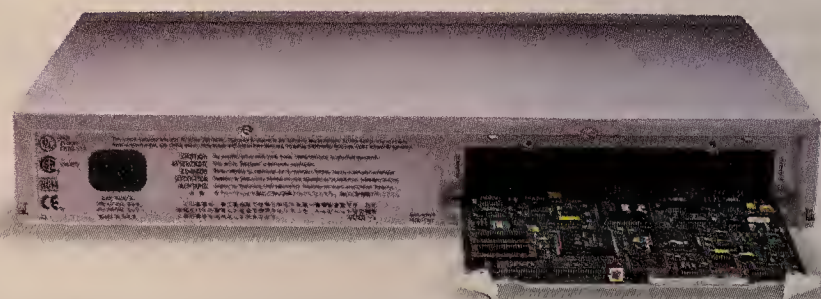
"That's a \$40 million to \$50 million business," says Zoldan, with significant profit potential for the ballclub. "And we'll be able to stretch our existing IS staff to cover it easily. With this setup, we can sit at any workstation on the network, even down in Winter Haven, and manage every aspect of the network."

## A NETWORK MANAGEMENT WIN

This ability to manage the entire network easily is crucial to the Indians' ability to control costs. The ballclub exists in a complex business information environment characterized by tens of thousands of cash transactions every day of the season—and sophisticated, large-scale financial planning, control, and analysis every day of the year. To win—on the field and off the field—the Indians have to manage this information environment and make it work. And to do that, they depend on Hewlett-Packard. ●



\*Customer must return warranty registration card to HP. Five-year on-site warranty, after five years return hub to HP. Power supply and fan covered by five-year on-site warranty only. 1 in Canada call 1-800-387-3867, Dept. 190. 11 Based on U.S. list price of 4/1/94. ©1994 Hewlett-Packard Company RND008



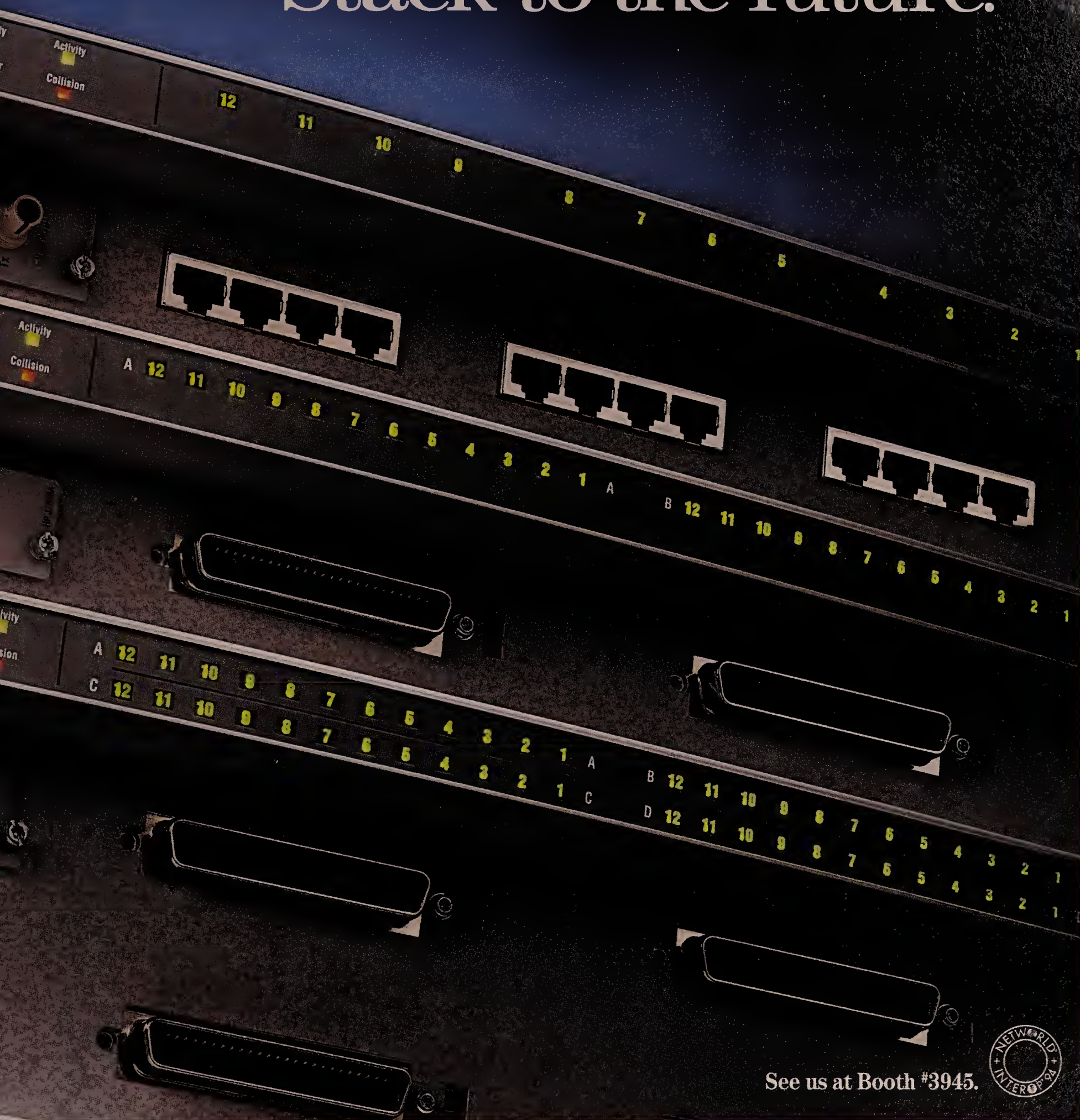
The HP AdvanceStack features an expansion slot that offers a flexible upgrade path to SNMP, bridging/routing, high-speed backbone connections and more.

## Introducing the HP AdvanceStack family of 10Base-T stackable hubs.

If you like the front of our new hubs, wait until you see the back. That's where you'll find their unique expansion slot, and proof of their unprecedented flexibility. Buy the HP AdvanceStack today and you get a low-cost solution for your current setup. Then when you



# Stack to the future.



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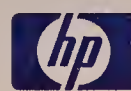
- Full stack manageable via a single SNMP module
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- Starting under \$90/port\*



want additional functionality, all you need is a cost-effective expansion module, not a new unit. Add a lifetime warranty\* backed by HP's reputation for quality and reliability, and we think you'll want to find out more about AdvanceStack right away. For fast faxed information, call 1-800-964-0714, or for a full product brochure, 1-800-533-1333, Ext. 8117.\*

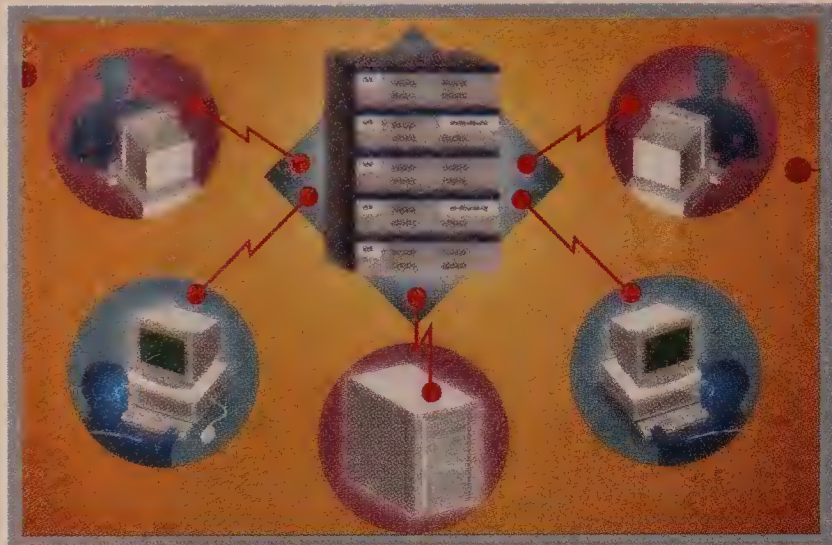
And discover why so many people are looking in back of the stack—AdvanceStack, that is.

**Another smart networking product from HP.**



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# A Stackable Architecture for an Open Network Future

**T**hey sound so simple: "Extend" and "Evolve." But these two new networking imperatives demand that network managers resolve a pair of exacting dilemmas. How can an organization extend the productive lives of today's equipment, and still have an architecture that can be evolved to accommodate the demands of future technologies? And how can it do the same things with its network management system? Hewlett-Packard has developed the AdvanceStack architecture and an OpenView-based management system to answer these questions.

Today's computing environment is distributed, full of existing systems, standardized, in need of powerful automated management tools, and is constantly changing to accommodate new technological futures. This is the environment for which the HP AdvanceStack network architecture, with its eight essential principles of distributed network connectivity, was built; it is open, distributed, scalable, predictable, dependable, economical, manageable, and it provides excellent performance. The net result is that the AdvanceStack architecture allows network managers to satisfy the imperative to not replace existing networks, but to extend and evolve them.

## EXTENSION

The distributed computing paradigm has triumphed, with small, powerful systems sitting on desktops and communicating over ever-faster networks. Yet to service these

networks, some manufacturers have built large hardware chassis with proprietary cards and fast backplanes that sit in central computer rooms—a kind of network-infrastructure "mainframe." This defeats the goal of distributing communications capability

throughout the enterprise, and results in a single point of failure that can knock out large chunks of the network.

Stackable network systems provide an alternative that maps more directly to the distributed nature of today's networks. HP's AdvanceStack network

connectivity products—hubs, bridges, and routers—use all of the same topologies and wiring as existing LANs. AdvanceStack hubs can be combined to provide good throughput for large numbers of users. They can seamlessly introduce increased performance into

## Making Fast Ethernet Real

**T**he promise of 100VG-AnyLAN, a new Fast Ethernet standard developed by Hewlett-Packard, is compelling: higher performance, integration with current networks, and the ability to handle new video and multimedia applications.

A natural evolution of 10BaseT Ethernet and Token Ring networks that supports their basic frame technology, 100VG-AnyLAN lets organizations extend and evolve their existing networks.

It can deliver 100 megabits per second (Mbps) to every node in a given network with no major software changes. It lets organizations preserve and leverage the overwhelming majority of their investments in Ethernet and Token Ring networks. And its deterministic Demand Priority arbitration system enables video, voice, and multimedia applications, which require guaranteed bandwidth and predictable, low latencies.

With the introduction of four new products—a hub, a 10/100 bridge module, and two adapter cards—Hewlett-Packard has become the first company to make the promise of 100VG-AnyLAN real. In isolation, these products extend the performance of 10BaseT networks. But as part of a product family, they also provide a migration path for the rest of HP's AdvanceStack systems, giving network planners a way to evolve existing systems so that they can include future, high-speed networking technologies.

The HP AdvanceStack 100VG Hub 15 is an intelligent central controller with 15 ports and one additional uplink

port that can be used to "cascade" hubs.

The HP 100VG SNMP Bridge Module is a bridge/SNMP management card that allows users to bridge to existing Ethernet networks.

And the HP 10/100VG Selectable ISA/EISA Adapters are cards that support 10BaseT or 100BaseVG operation, giving users and administrators a great deal of flexibility in allocating bandwidth where it is needed most.

Because it accommodates existing equipment and systems so well, 100VG-AnyLAN gives users some powerful advantages. It requires no changes to application software on clients or servers, and is compatible with current NOSs. It requires no changes to bridges and routers, supporting the frames and network management systems already in use. It gives users 100 Mbps performance. It gives administrators a seamless way to boost the performance of 10BaseT by a factor of 10. And it gives organizations a networking system that allows them to realize these higher data rates over existing Category 3, 4, or 5 wiring, thus obviating one of the biggest costs of network upgrades. In short, it gives anyone making network decisions a way to sidestep the old choice between getting higher performance or preserving existing systems. With 100VG-AnyLAN, for the first time, they can do both. ●

**For data sheets on HP's 100VG products, call 1-800-296-5810, ext. 200, or check 100VG-AnyLAN on the business reply card.**



# Want more info? Call 1-800-296-5810, ext. 200

Or, if you prefer, complete the following and we'll send you information directly.

- ☐ PCI
- ☐ Network Printing
- ☐ Integrated 32-Bit Networking
- ☐ 100VG-AnyLAN
- ☐ MP Spec
- ☐ DMI
- ☐ HP AdvanceStack

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Title

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Please rate the information provided in this supplement (circle one):

Excellent

Very good

Good

Satisfactory

Not satisfactory

What could we do to make the material more useful to you?

## What kind and quantity of HP equipment do you plan to buy:

	Desktop PCs	Servers	Mass storage products	Network printers	Network software	Network hardware	Service & support
Within 3 months	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Within 6 months	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quantity							

Are you currently working with an HP reseller? ☐ Yes ☐ No

If not, would you like an HP reseller to call you? ☐ Yes ☐ No

Would you like to receive future information on HP's PC networking products? ☐ Yes ☐ No





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any place on the network, as it is needed. With their "instant-on" capabilities, AdvanceStack products can be used to easily connect existing LANs. And because they all support major networking standards, they can be introduced into existing networks with no NOS or application software changes. In other words, HP's AdvanceStack products allow network managers to extend existing networks to meet new requirements without having to change the entire network infrastructure.

## EVOLUTION

For its ability to evolve to meet constantly changing future needs, the AdvanceStack architecture has no competition. Because of the ability to "stack" multiple units to add incremental performance, the architecture is almost infinitely scalable. It also offers a complete range of price/performance options: 10 Mbps to 100 Mbps shared-bandwidth LANs; 10 and 100 Mbps switched LANs; high-speed async and synchronous remote links; and, in the future, local and remote ATM switching and routing.

Given networks' propensity for growth, this scalability and range are powerful advantages. When coupled with AdvanceStack's standardization, the benefits are even greater. Network managers are being asked to control operations costs, to not shut the door on future video and multimedia applications, and to avoid dead-end expenditures. AdvanceStack's ability to accommodate all major standards obviates these potential pitfalls, enabling managers to evolve the network easily to meet even the most rigorous application requirements.

## NETWORK MANAGEMENT

Of course, none of this would be any good if AdvanceStack did not also offer the network management tools that administrators need. To achieve well-managed networked PC hardware in today's distributed environment, management solutions must be integrated and open: integrated so that people can manage disparate networks

from a single platform; and open so that they have the ability to add new tools to the management platform as they are developed.

HP's network management is built on the industry-standard OpenView network management platform, with support for MS Windows™, Windows NT, and UNIX®. In addition to hundreds of third-party management applications, HP has a core set of applications built on OpenView that allow network administrators to select a level of management appropriate to their network: basic management, for networks that do not need SNMP management, but do require configuration, monitoring, and troubleshooting; SNMP management for larger, more traffic-intense networks with tools for increased security, network firmware management, and network diagramming; and advanced management based on HP's EASE instrumentation—instruments embedded into AdvanceStack hardware that help optimize network performance, pinpoint trouble spots, and define traffic patterns.

## THE BIGGEST POTENTIAL GAINS

Extend and evolve. Both HP's AdvanceStack architecture and its OpenView-based management solutions are designed from the ground up with these in mind. AdvanceStack extends and evolves the actual network infrastructure. And the management solutions help extend the useful lives of past investments while they help users evolve their management capabilities, keeping future options open by adhering to an open architecture that supports all major management standards. Providing cost-efficient, open, and flexible networking in today's environment is a challenge. But given the potential gains in productivity that could result, it is a challenge well worth meeting. ●

**For data sheets on the HP AdvanceStack products, call 1-800-296-5810, ext. 200, or check HP AdvanceStack on the business reply card.**

## DMI continued from page 12



environments, and many DMTF members—including IBM, Microsoft, and

Intel—are either investigating the possibility or planning to incorporate DMI into their offerings.

## A TWO-PHASE DMI STRATEGY

Hewlett-Packard has a two-phase strategy in DMI. The first is Remote Management, which ensures that HP systems have the hardware, firmware, and software to take advantage of DMI's ability to remotely manage PCs. The HP Vectra M2, N2, and XU PCs—and future PCs from HP—will implement this first phase. Remote Management includes alert management and automatic alert propagation through various communications media to network managers. HP's particular value-added will be the user's ability to remotely manage the company's trouble-free personal computing (TFPC) features: ease of use, setup, security, for example. This first phase is essentially concerned with either initialization or reacting to negative events.

Active Management is the second phase, which involves remote firmware upgrades, software revision control,

group client control, and the ability to send broadcast messages. The second phase allows systems administrators to manage for optimum performance, not just fewer service interruptions.

The reason DMI is important is that it holds such promise for reducing one of the rising costs of networking: the cost of maintenance and administration in an environment where networks are getting bigger and more important with each passing day. With the ability to remotely manage PCs down to the component level, administrators can dramatically reduce the cost of ownership by managing larger networks with smaller numbers of staff.

The addition of DMI to Hewlett-Packard's line of Vectra PCs rounds out the capabilities of a system built for demanding networked computing environments. Remote management enables users and administrators to more fully exploit these systems' fast processors, advanced bus architectures, impressive video capabilities, and integrated 16- and 32-bit networking capabilities. Because with DMI, administrators can manage PC systems for optimum performance, not just acceptable levels of downtime. ●

**For data sheets on the DMI-compliant HP Vectra PCs, call 1-800-296-5810, ext. 200, or check DMI on the business reply card.**

## 32-Bit Networking

continued from page 12

supported by PCI. The details of 32-bit/64-bit translation are transparent to PCI.

Finally, HP's integrated 32-bit networking strategy improves network throughput by exploiting PCI's concurrent processing advantages. The network controller chip contains all of the logic necessary to send and receive data and network requests with an absolute minimum of CPU intervention. The usual two-step buffer memory

system is therefore unnecessary, which improves network performance. And the CPU is freed for other tasks, which improves system performance. And if system performance is improved, then data is getting to the network faster; and the network-performance implications of that are clear. ●

**For a data sheet on the HP Vectra XU PC and a white paper, call 1-800-296-5810, ext. 200, or check Integrated 32-bit Networking on the business reply card.**

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# DHL takes advantage of telephone server tool

BY ADAM GAFFIN

Santa Clara, Calif.

Just like its archrival Federal Express Corp., DHL Worldwide Express, Inc. gives customers software for tracking packages around the world.

But starting this week, customers will be able to use push-button phones to get that information, as well.

DHL will use server software from Edify, Inc. to give callers entree to its worldwide package tracking net. A central database holding package status information feeds data to the Edify server, which, equipped with voice-synthesis software, informs the caller. If the package has been delivered, the system can even report who signed for it. If the package cannot be located, the system will automatically switch the caller to a human agent.

About 10% of the U.S. already has access to the new system, with another 50% going online this week.

Edify's Electronic Workforce software is designed to automate many routine information-related tasks. It features agents, which are

designed by the user, to perform specific tasks, in particular, interacting with such resources as push-button telephones, facsimile servers and electronic mail. The company has recently targeted the interactive voice response (IVR) market, although company officials said they are developing a client version that will let desktop users interact with a variety of back-

end applications and processes.

In August, Edify plans to ship a new version, 3.2, with a series of enhancements, including text-to-speech capability, support for automatic number identification and an increase in the number of phone lines supported by a server. The company will also roll out a version designed specifically for IVR.

Alan Boehme, marketing manager for DHL's customer access program, said the Agent Trainer application development tool sold him on the Edify package.

Agent Trainer is a graphical tool that lets a developer build applications. Other similar

applications often require the use of scripting or forms-based languages.

When a caller punches in package data, the Edify server connects to the firm's main package database, an Informix database on a Hewlett-Packard Co. server. Rather than using a data access technology, Edify uses a terminal emulator that can be "trained" to recognize and use information from specific fields on a database screen.

Edify's Electronic Workforce software currently resides on OS/2 servers. Pricing for Version 3.2 will start at \$1,950 for the IVR version.

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## IBM study

Continued from page 37

often bring dramatic changes in the way people work and that failing to deal with end-user concerns and the impact on corporate culture can lead to serious problems, said Mike Sinneck, the group's vice president for application solutions consulting.

Sinneck said the most successful client/server applications are those that support a change in business processes, rather than those that automate existing procedures.

Other keys to success, according to the survey, are:

- Creation of small teams of programmers and end users in the same physical location to tackle specific problems.
- Strong support by an executive.
- Good knowledge of existing networked infrastructure.

Metropolitan Life Property and Casualty, based in Providence, R.I., took those lessons to heart when it switched its underwriters from a host-based system to a client/server system for analyzing information about new clients.

Previously, underwriters used dumb terminals to access a host databases, so extracting and analyzing data was laborious. The company wanted to create a server-based application from which an underwriter, by issuing a single request, could quickly retrieve information via these databases in a consistent format.

One of the company's first steps was to assemble teams of programmers and underwriters to help build the application, said Joseph Imholz, vice president and chief information officer at the MetLife subsidiary.

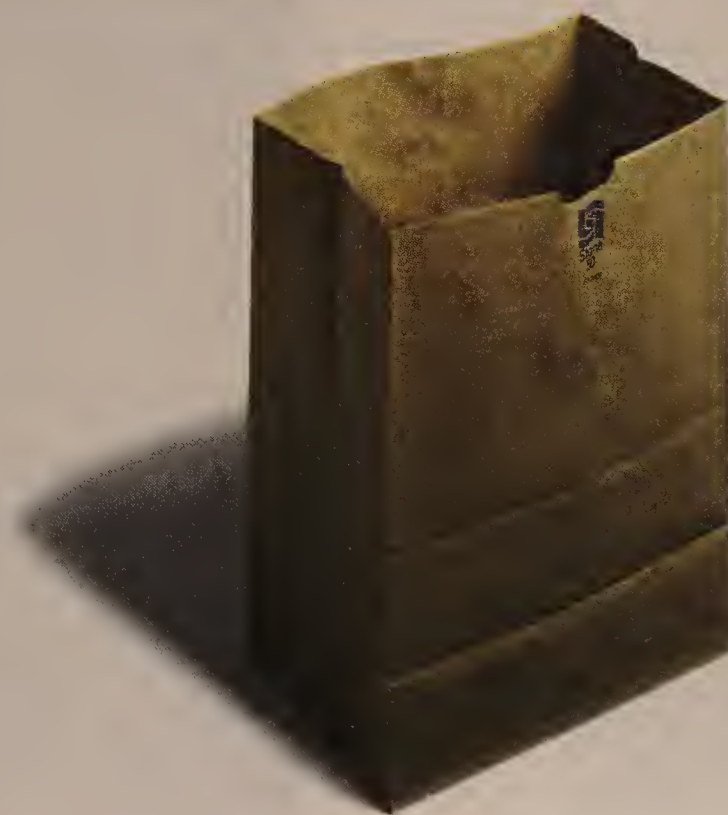
Imholz said the rollout cost \$1.7 million, but the firm now sees annual productivity gains and other savings of \$1.2 million, he said.

Sinneck said most of the projects studied were finished late and over budget but that overall user satisfaction was high, which he said was likely due to the fact that most were driven by business units rather than MIS.

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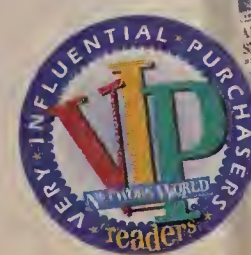


## Their Readers.

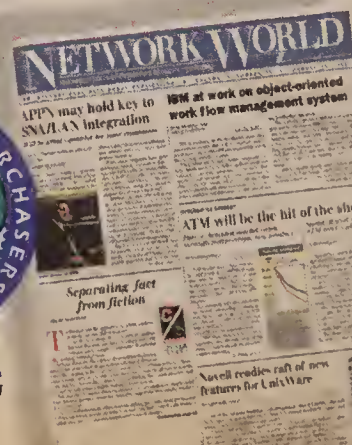


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## DATABASE ACCESS

# Borland concedes to market, will support Microsoft's ODBC

BY BARBCOLE

Scotts Valley, Calif.

Almost two years after announcing its Integrated Database Application Programming Interface (IDAPI), Borland International, Inc. is beta-testing software that will let its own front-end tools work with Microsoft Corp.'s rival Open Database Connectivity (ODBC) specification.

The ODBC IDAPTER, due this summer, is software that will let Borland applications access dozens of data sources through ODBC drivers. IDAPTER, which was written by Intersolv, Inc., will show up in dBase for Windows and Paradox for Windows, Borland confirmed.

longer going to promote it as an industry-wide standard that everyone can write to," said Kyle Geiger, ODBC architect at Microsoft.

Borland shipped a developers' kit for IDAPI in April, and Burton said she expects developers to write IDAPI drivers for non-Bor-

land applications because "IDAPI offers some performance benefits over ODBC."

Burton said IDAPI has served Borland well. "We have a common, unified engine in our products now that is part of IDAPI. We have done what Microsoft is attempting to do with its Jet engine," she said.

Jet engine is Microsoft's common database engine found in Access, FoxPro and Visual Basic.

But developers said too much time has passed for them to consider using IDAPI. "I've mastered ODBC, and I don't think much is going to happen to IDAPI," said Casey Hop-

son, an independent application developer in Ellicott City, Md.

Industry support for IDAPI has clearly diminished since Borland teamed up with Novell, Inc., WordPerfect Corp. and IBM to announce IDAPI in 1992. At one point, more than 50 software companies had announced support for IDAPI.

Since that time, Novell and WordPerfect have announced plans to merge, and Novell and IBM have both announced support for ODBC. WordPerfect refused to comment on its involvement with IDAPI.

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### The history of IDAPI

<b>November 1992</b>	Borland announces IDAPI in conjunction with IBM, Novell and WordPerfect.
<b>March 1993</b>	Borland delivers paper specifications for IDAPI, which the company claims is now supported by 54 companies.
<b>August 1993</b>	Borland says the IDAPI developers' kit will be delayed due to changes in the SQL Access Group's Call Level Interface specification.
<b>April 1994</b>	Borland introduces a beta version of the IDAPI developers' kit to about 100 developers in San Jose, Calif.

IDAPI lets front-end applications access back-end data sources. The platform-independent IDAPI supports both set-oriented access methods typically used by SQL databases on larger systems and navigational capabilities found in desktop databases. Borland IDAPI consists of two parts, a middleware part and a common database engine that is in beta. ODBC is Microsoft's Windows-based middleware data access technology that has gained widespread acceptance.

### ODBC ACKNOWLEDGMENT

Analysts and vendors said Borland's support of ODBC in its own products shows that the financially troubled company has acknowledged that there is little interest in IDAPI and that ODBC has become the de facto standard for database access.

"IDAPI makes sense as an internal standard for Borland products to communicate with database servers. But nobody views IDAPI as a standard API," said Richard Finkelstein, president of Performance Computing, Inc. in Chicago.

Borland argued that it never intended to enter into an API war with Microsoft and that it is simply providing its customers with the technology they need to do their jobs.

"IDAPI and ODBC actually play quite well together. Our intent was always to follow the industry standards [for databases access], which are determined by the SQL Access Group," said Betsy Burton, senior product manager for InterBase at Borland. "We support ODBC," she added.

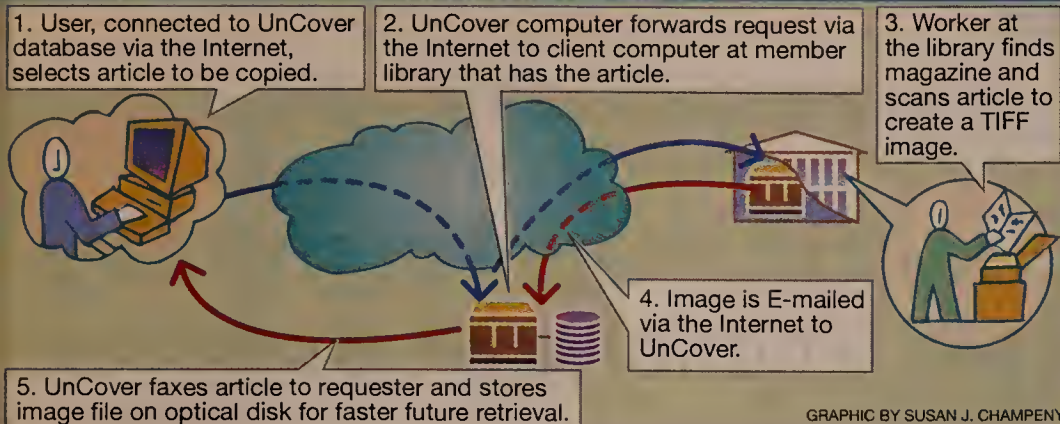
Microsoft's view is that IDAPI was meant to compete with ODBC. "Our sense is that Borland is going to use IDAPI in some form or another in its own products, but they are no



SITBON-KUREL THIDLY



## Under the covers of an Internet-based fax service



# Planning, copyright issues key to company's on-line success

BY ADAM GAFFIN

Denver

A company here is using the Internet to bring push-button ease to the once tiring work of finding information from among thousands of journals and magazines.

Since 1991, Internet users have been able to connect to a database maintained by the

UnCover Co. that lets them search for articles from various publications and, for a fee, obtain faxed copies of the information.

The company, a joint venture of the Colorado Alliance of Research Libraries Corp. (CARL) and the Blackwell Group, a worldwide library supply company based in Oxford, England, now maintains a database of some five million citations from 16,000 journals and magazines.

The idea is to give libraries and individuals access to a range of journals they could not maintain themselves, said Chris Beckett, business development manager at Blackwell.

Careful attention to planning, copyright issues and the use of an easily expandable Tandem Computers, Inc. mainframe-based database have enabled the company to grow from its 1988 origins as an indexing service for Colorado research libraries, said Martha Whittaker, UnCover's general manager.

## LOW TECH/HIGH TECH

When an Internet user selects an article from the UnCover database, its Tandem CLX-R mainframe routes the request to whichever library has a physical copy of the journal. There, a librarian gets the journal off the shelf and uses a scanner to create a tagged image file format copy of the article. This is then sent via E-mail to UnCover, where the mainframe routes it via fax modem to the user's facsimile machine.

**The mainframe is connected to more than a dozen libraries around the world via the Internet.**

The mainframe runs custom database software built in-house with Tandem's Enscribe file management software and is connected to more than a dozen participating libraries around the world via the Internet.

When CARL started UnCover in 1988, it already had its own Internet-based cataloging system for participating members — adding a service in which CARL created a catalog of members' journal holdings seemed a natural progression, Whittaker said.

Last year, CARL spun UnCover off as a separate firm, selling a half share to Blackwell.

## JUST THE FAX

Whittaker said it would be possible to send articles directly over the Internet to user's computers, but there are a variety of technical and policy reasons for not doing so — most notably the high amount of bandwidth required to send images and copyright issues related to unauthorized distribution of articles.

Today, UnCover sends out 700 to 1,000 articles a day, Whittaker said.

Another potential issue is security of the credit card numbers users input to pay for the fax service. Whittaker said the use of Telnet to connect to UnCover is more secure than normal Internet E-mail. When casual users type in their card numbers to make an order, the numbers stay in the UnCover computer only long enough to be verified with a credit card company. More regular users can establish on-line profiles that include their credit card number, but these are stored in a secure database. □

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## EDITORIAL

### Straighten out the mess

In a fiery speech before the nation's business leaders, President Clinton last week vowed not to let his beleaguered health care initiative die in Congress.

While the administration's health care reform bill has been the focus of national debate, another key legislative effort also languishes, desperately needing high-level attention from Clinton and his Information Superhighway cheerleaders, Vice President Al Gore and Secretary of Commerce Ron Brown.

In January, the administration pledged to reform telecommunications regulation; but so far, little has happened. Two ballyhooed bills incorporating key White House ideas for reshaping the network industry have gotten bogged down — as "Free the Bells" legislation has done in many a Congress past — and the regulatory picture gets more complicated every day.

Simply put, the courts, Congress and the FCC are at loggerheads on what carriers and cable companies can and can't do, and the confusion is hurting the industry.

The FCC, struggling in its own fits-and-starts way to spur competition, is constantly being rebuffed by the courts, which have strictly interpreted the antiquated Communications Act of 1934.

In just the past couple of weeks, an appeals court overturned a key FCC ruling spurring competition in the local loop, and the U.S. Supreme Court reaffirmed a lower court's reversal of an FCC order streamlining the tariff filing process. Those rulings are just the latest in a string of setbacks for the agency, which has also been buffeted about on custom network and Open Network Architecture decisions, among other things.

The FCC isn't the only one that's gotten rough treatment in the courts. Congressional legislation barring the Bell companies from offering cable television services in their own operating territories has been overturned in an appeals court, and the case may well wind up before the Supreme Court.

This back and forth will continue until new legislation clearly maps out the dos and don'ts for the Bell companies and the cable companies, and clarifies the FCC's new role. And that's a big problem for the industry.

For example, consider the chaos that would result if an unhappy bidder were to challenge the FCC's auctions after all the bandwidth for personal communications services (PCS) is sold off. That's not just a theoretical problem. Virtually every major FCC policy has been challenged of late, and, with so much money at stake in the PCS realm, it's likely that someone shut out of the revenue stream will raise a stink.

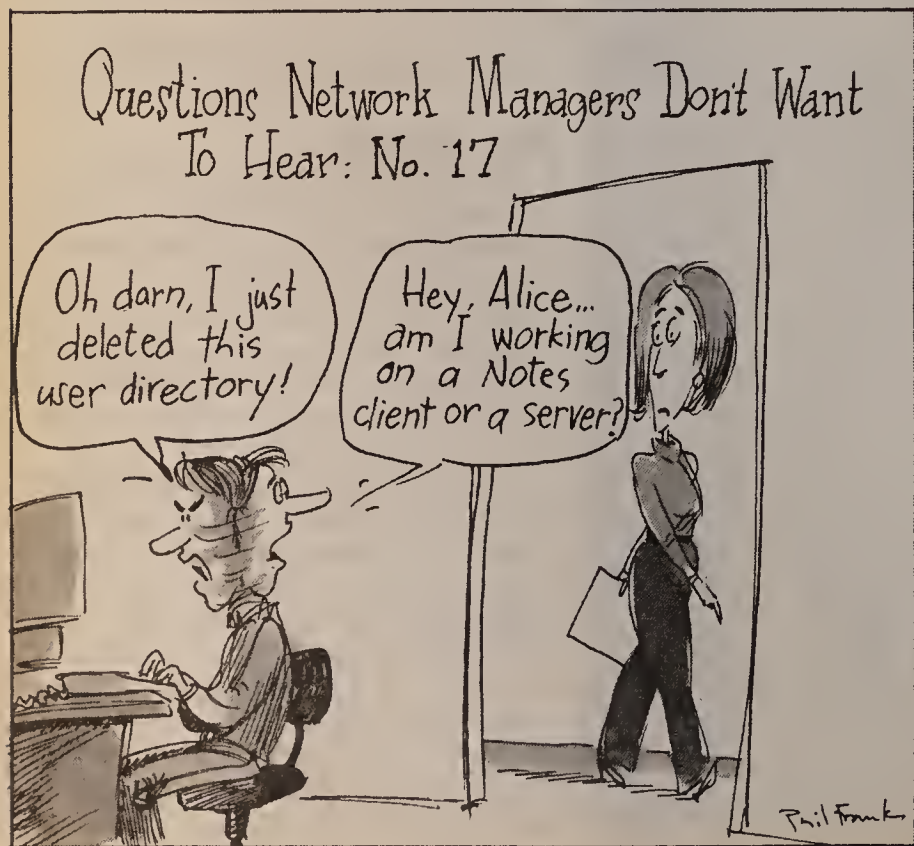
This administration has said over and over that the communications industry is a key driver in economic growth. But it has to back that up by achieving regulatory reform. The White House has to marshal its forces and make things happen on Capitol Hill before the enthusiasm about convergence and the Information Superhighway dissipates.

♦♦ JOHN GALLANT

jgallant@world.std.com

## TELETOONS

FRANK AND TROISE



## MACROSCOPE

by James Kobielus

### Government should deregulate crypto technologies market

**T**he time has come for governments everywhere to relinquish their Cold War stranglehold on network cryptography (NW, April 25, page 4). There should be a free market in cryptographic technologies, unencumbered by government regulations, restrictions and export controls.

Commercial development of the promised Information Superhighway depends on the availability of cheap, efficient, powerful crypto technologies. Cryptography is the seedbed of many fundamental electronic-commerce services, including digital signatures, multilevel access control, content confidentiality, certificates, electronic postmarking, key distribution and license management.

These cryptography-enabled services can make networks safe for both the purveyors and consumers of intellectual property. Crypto technologies make it possible, for example, to assure software publishers that their products are reaching paying customers intact when transmitted over networks. Crypto-enabled authentication schemes can also ensure that software is being used in compliance with license restrictions.

Using crypto-enabled authentication schemes, users fearful of network scams would be able to authenticate vendors sight unseen by validating vendors' digital signatures. In addition, debit and credit card numbers could be encrypted when users are ordering goods electronically, easing users' concerns about eavesdropping by network-based dumpster divers.

If allowed to flourish in a competitive marketplace, alternative cryptography schemes such as Pretty Good Privacy (PGP) — a three-year-old public-key shareware algorithm — would guard against unauthorized access to software, data and other digitized assets. As John Perry Barlow, co-founder of the Electronic Frontier Foundation, stated recently: "Cryptography...is the 'material' from which the walls, boundaries — and bottles — of cyberspace will be fashioned."

Unfortunately, crypto technologies are utilized only sporadically on today's public and private networks, due to stringent controls by the National Security Agency (NSA), Federal Bureau of Investigation and other supersecret government organs. Zealous government regulation prevented the development of a mass market for crypto technologies. As a result, today's commercial crypto products are often expensive, inefficient and cumbersome.

The NSA vigorously defends its traditional role as the cryptography overlord for the U.S. and, by extension, for the entire free world. International terrorism, nuclear proliferation and drug trafficking have supplanted the defunct communist conspiracy as the threats cited by the NSA in defense of continued government controls on crypto technologies.

In addition, the NSA has actively discouraged the development of commercial alternatives to the federal Data Encryption Standard, fearing that even the agency's fastest supercomputers would be unable to crack cryptographic algorithms such as PGP. Efforts to establish U.S. standards for secure data network services have been bogged down in endless federal

bureaucratic reviews. Export controls have prevented U.S. security firms — the world's recognized leaders in cryptography — from selling their most effective products to an eager international market.

Fortunately, the NSA's hegemony over U.S. cryptography may be on the wane, due in part to public furor over its recent Clipper Chip proposal. The agency has proposed that all new digital telephones, computers and other network devices sold in the U.S. be equipped with Clipper encryption chips incorporating the NSA-developed Skipjack algorithm. Under the NSA's proposal, the Skipjack key for each Clipper-enabled terminal would be broken into two halves that are held in escrow by the Department of the Treasury and the National Institute of Standards and Technology.

Clearly, the Clipper/Skipjack scheme was designed to allow the authorities to eavesdrop on voice, data and other communications over the public network.

What has civil libertarians and privacy activists up in arms is the prospect of entrusting their encryption keys to any third party, much less the intelligence apparatus of the U.S. government. They take little comfort in the NSA's proposal that law enforcement agencies be required to obtain court orders to gain access to people's full Skipjack keys.

The Clinton-Gore administration has endorsed the Clipper Chip in principle but, in the face of near-unanimous computer and telecommunications industry opposition, has backed away from making the technology mandatory. Foreigners have also turned a cold shoulder to Clipper, saying they will never buy crypto technologies that give another country's government privileged access to their communications.

What the Clipper Chip controversy shows is that even the world's last superpower is powerless to prevent the growth of a free market in crypto technologies. Clipper/Skipjack technology will become just another choice in the crypto marketplace. And it may be a good choice for corporations that want to monitor internal communications and prevent insiders from giving away trade secrets.

Governments everywhere will have to accept the fact that the average citizen — and, unfortunately, the average criminal — has access to strong encryption schemes. But there's no need to weep for the NSA and other crypto agencies. They will continue to develop ever more powerful supercomputers and mathematical tools to crack whatever codes come their way.

When network crypto technologies come out of the closet, life will get a bit harder for the code breakers of the world. However, secure network-based electronic commerce will become a whole lot easier for the rest of us.

Cryptography is a defensive technology on a par with burglar alarms, dead bolts and padlocks. Consequently, anyone should be able to use the biggest, baddest encryption and authentication schemes we can lay our hands on.

♦♦ Kobielus, a contributing editor to *Network World*, is a senior telecommunications analyst with Alexandria, Va.-based Dyn Network Management, Inc. The opinions expressed are his own. He can be reached at (703) 922-6829.











# PRO Do network servers really require the power of Pentium? CON

BY JAMES HANSEL

Are some of your advisors telling you that a 486 processor is just fine for a network file server? They may be right today, but they'll be wrong tomorrow. Considering the useful life of a file server and how things are changing, an Intel Corp. Pentium-based server makes much more sense.

Today, a 486 processor is adequate for the typical Novell, Inc. NetWare file server, because it is just that — a file server. If you don't use many Netware Loadable Module programs (which execute on the server), your file server is effectively only a shared hard disk, and you will rarely use more than 10% to 20% of its CPU capacity. Because hard disk drives and today's 10M bit/sec Ethernet and 16M bit/sec token-ring networks are relatively slow, your file server's CPU spends most of its time waiting for its hard disk drives to read or write data files, or waiting for the network interface card (NIC), which connects the file server to the network, to send or receive network packets.

In other words, your system is disk-bound and network-bound, not CPU-bound. Those bottlenecks at the disk drives and the NICs give us a clue as to which network components are going to undergo major changes over the next one to three years. Those impending changes in component technology are the reason you should choose a Pentium processor over a 486 in your server today.

Let's investigate those clues. First, if the system is disk-bound, the endlessly inventive personal computer industry is bound (forgive the pun) to invent a better disk subsystem. Redundant Array of Inexpensive Disks (RAID) are getting faster and larger all the time. With higher speed system buses, such as the Peripheral Component Interface, and faster and faster RAID controllers, the server CPU is going to have a lot more data to juggle and therefore will require more power. Score one point for the Pentium. Second, if the system is network-bound, the PC industry will invent a better network. If you read the trade publications, you've heard the noises from various network equipment vendors. Fast Ethernet, Fiber Distributed Data Interface, Asynchronous Transfer Mode (ATM) and switched Ethernet will uncork the network bottleneck. The result will be more packet data for the file server's CPU to receive and send — which, again, requires more power. Score another point for the Pentium.

Why is the network so busy, anyway? Part of the reason is that we keep large databases on the file server. Then, we use PC-based database software to manipulate those large databases. That means we tell the file server to send huge chunks of database files over the network to be selected, projected and updated at the PC workstation, then we send huge chunks back to the file server to be written to disk.

The Unix world solved that problem for us by developing client/server technology. Users of networked PCs are finally talking about client/server, but we're going to be doing more than just talking about it in a year or two. Client/server database software actually runs on both the server and the workstation. The workstation handles the user interface, but the database engine runs on the server, where the data is, keeping the server CPU even busier. The execution speed of database operations will depend on the speed of the server CPU. Score a third point for the Pentium.

What about the issue of cost? It does matter what you pay for your server. Choosing a 486 processor over a Pentium processor will save you money, as your dealer will tell you. This means that next year, when your users complain about the low speed of their database operations, you can tell them you saved a few hundred dollars. Final score: Pentium gets 3, the 486 gets 1.

Get Pentium-based servers, because the reasons you could get by with 486-based file servers are going away. Say goodbye to the disk drive and NIC bottlenecks.

Meanwhile, say hello to database server programs, such as Sybase, Inc.'s SQL Server and Borland International, Inc.'s Interbase, which will reduce your network traffic by transferring the load onto your server CPU and, therefore, will require file servers to have higher capacity CPUs. And say goodbye to the experts who say CPU speed doesn't matter in file servers. Time will prove them wrong.

◆ Hansel is vice president of investment systems for UBS Asset Management, Inc. in New York. He can be reached at (212) 789-7106 or via MCI Mail at 406-2727.

BY DAVE YAKERSON

For the average user company, 486-based machines currently represent both the most practical and cost-effective option for network file servers. In the average office, end users' basic tasks involve spreadsheets, word processing and graphics. Network servers function as little more than data warehouses in addition to providing print and (sometimes) electronic mail functions. In this environment, 486-based file servers are more than adequate — certainly more than capable of handling this activity for the near future — and represent the best bang for the buck on the market today.

No one would argue that users want their file servers to be fast. But users should always ponder when to invest in new technology by looking carefully at other variables, such as price vs. performance and technology longevity issues, to determine where capital dollars would best be spent.

Today's budgets are carefully scrutinized, and all managers want to get the most for their investment dollars for the longest period of time. Prices for PCs equipped with 486-based Intel Corp. DX2 processors are now close to what 386/25 machines would have cost a few years ago. Few organizations can afford to keep investing in server upgrades every two years. The tremendous bargains in the 486 server and desktop marketplace offer good value when compared with the premium for Pentium.

**PENTIUM**  
**VS.** **486**

Those responsible for preparing budgets for 1995 would be wiser to take the money they would have spent this year upgrading their file servers to Pentium and investing it in more powerful computers for their end users. With the popularity of Microsoft Windows and graphical user interface-based applications, end users need more power at their desktop, not at the server. Windows and its various applications demand

increasingly more raw CPU horsepower to provide a more productive user environment. Give users the power of Pentium at their desktops, where it can improve their productivity and thus contribute to your organization's bottom line. In this way, the technology will be immediately more useful and certainly more appreciated.

If you think you need more power for your networked applications, carefully study your current system's bottlenecks. Otherwise, your upgrade recommendations will be based on nebulous data. There are many factors that contribute to the speed of network file service, including: the efficiency of the application software being used; protocol stacks and LAN adapter cards being used; server-to-client ratios; network topology; server disk access times and throughput rates; types of I/O buses being used; and the amount of memory in both client and server machines. Blindly buying a new Pentium-based box is wasteful and inefficient if it is just adding more power to a currently underutilized server.

Competitors of Pentium are already beginning to challenge Intel's hold on the PC server market. Digital Equipment Corp. and the Apple Computer, Inc., IBM and Motorola, Inc. collaboration have produced worthy sparring partners for Pentium. And more and more semiconductor manufacturers are designing and producing 64-bit chips with increasingly faster clock speeds, making the price vs. performance ratio more attractive than Pentium's.

As more players get involved in manufacturing 64-bit chips, the pricing should be very competitive, making the prospect of your next file server not saying "Intel inside" a good possibility. By then, applications will have been redesigned and recompiled to take full advantage of the new architectures, making them even more efficient.

The bottom line is that 486 file servers are your best buy right now. Saving money or redirecting and reinvesting it in your end-user platform is a wise strategy at this time. By waiting for 64-bit technology to hit the market, you will be investing money in a technology that will have an even longer life expectancy, and you won't find yourself having to trade in your Pentium systems in 1996.

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Letters have moved this week to page 58.





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# Buyer's guide

**I**n this age of downsizing, many network managers are unwilling to risk running mission-critical applications on pip-squeak, crash-prone LAN servers. But have no fear — superservers are here, and they're now ready for prime time.

Thanks to steady technical advances during the past year, superservers provide overall system capacity, performance, fault tolerance, multiprocessing support, a massive number of disk arrays and system management on par with mainframes and minicomputers.

While superservers have advanced technically enough to become a viable alternative to larger systems, defining just what one of these beasts really is remains perhaps the toughest task in the selection process.

The superserver market emerged around the turn of the decade and continues to evolve rapidly. More than 40 vendors claim to offer superservers in any of a head-spinning variety of forms, including high-end machines which could just as easily be labeled "minicomputers" and "low-end systems" that are a notch above the typical personal computer.

It gets difficult to draw apples-to-apples comparisons when everything being called a "super-server" is lumped into the same group. But the task gets easier if users adopt an emerging industry-standard definition when deciding which products to evaluate.

According to this definition, superservers sport two or more Reduced Instruction Set Computing (RISC), Intel Corp. Pentium or 80486 CPUs and use a tiered-bus architecture in which a proprietary, high-speed system bus interconnects multiple, industry-standard I/O buses housed in the same chassis.

To fit the definition, superservers must also support Redundant

## Servers on steroids

By JAMES KOBIELUS



Technical advances enable RISC- and Intel-based superservers to rival the big iron, but beware of pretenders.

Array of Inexpensive Disks (RAID) storage as well as symmetric multiprocessing (SMP), which enables tasks to be spread across multiple CPUs, or asymmetric multiprocessing (ASMP), which enables CPUs to be dedicated to processing specific tasks. Tricord Systems, Inc.'s PowerFrame Models 20, 30, 40, 300 and 400 go the definition one better by supporting both SMP and ASMP.

In contrast, traditional local network servers — even some units being called superservers — are built like desktop PCs, sporting a single CPU, one bus and a limited number of mass-storage devices. This limited architecture places serious constraints on performance, capacity, expandability and reliability. Running corporate applications on traditional, single-processor LAN servers can be a bit like squeezing the office bowling team into a Volkswagen Beetle.

Yet because of their youth, superservers hold a small share of today's LAN server market — only about 3%, according to International Data Corp. (IDC), a Framingham, Mass., market research firm. Now that superservers are more mature, IDC expects them to outsell traditional LAN servers 2-to-1 by 1997 as their importance grows in being platforms for corporate applications that have been downsized from mainframes and minicomputers.

Users can narrow the field of contenders to a choice few by applying the same primary criteria used to select a mid-range computer: the systems' compatibility with existing operating system, network operating system (NOS) and application software; CPU, memory, disk and network capacity; performance; reliability; and manageability.

While the type of CPU the superserver uses is still an important criterion, it is becoming less of an issue as the similarities between RISC and Intel processors start to outweigh the differences. While both

types of CPUs run very different software, Intel CPUs are gaining on RISC in the total amount of random-access memory and disk space they can support, which are important considerations for system performance and capacity.

### THE SUPERMARKET

Despite the gains made by Intel CPUs, systems that utilize Sun Microsystems, Inc.'s SuperSPARC, Digital Equipment Corp.'s Alpha AXP, Hewlett-Packard Co.'s Precision Architecture (PA)-RISC, Silicon Graphics, Inc.'s MIPS and other RISC-based CPUs are still at the high end of the market. At the low end are systems built around Intel's Pentium or 80486 CPUs.

Some vendors, such as Large Storage Configurations, Inc., offer systems that utilize multiple Motorola, Inc. 68040 CPUs, but those vendors are niche players when compared to the number of companies hawking RISC- and Intel-based systems.

RISC- and Intel-based superservers differ principally in their price and performance, along with the type of operating system and NOS they run. RISC-based machines are pricey — running about \$70,000 on average — and limited to running Unix-based operating systems and NOSes, but they boast superior performance and capacity. An Intel-based superserver has an average cost of \$27,800 but can't quite match RISC performance. Intel-based units run a mix of existing operating systems and NOSes faster than traditional LAN servers.

The premium price of RISC-based superservers may generally be attributed to their faster CPUs, higher throughput bus architectures and their ability to run sophisticated operating systems and NOSes

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inside

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# Superservers

Company	Product	CPU		Operating systems	NOS	Network adapters							Multi-processing	Max. RAM	I/O bus				Storage				Mgmt. agent	Reliability					Price/Warranty (months)	Standard configuration			
		Type/Top speed (MHz) 8 = 80486 R = RISC P = Pentium	Max. no.			D = DOS OS = OS/2 U = Unix W = Windows NT O = Other	L = LAN Manager N = NetWare S = LAN Server V = VINES W = Windows NT	Ethernet	FDDI	Serial	SNA/SDLC	Token ring			X.25	Max. slots	A = Asymmetric S = Symmetric	(bytes)	E = EISA I = ISA P = PCI V = VMEbus O = Other	Max. no. of busses/ Max. no. of slots	Average bus throughput (bit/sec)	OP = Optical R = RLL S1 = SCSI 1 S2 = SCSI 2 O = Other		Max. capacity (bytes)	RAID levels	P = Proprietary S = SNMP	Uninterrupted power	Disk hot swaps			Disk mirroring	Auto memory fault recovery	Auto power supply fail-over
Acer America Corp. (800) 368-2237	AcerAltos 17000	P/60	4	D, OS, U, W	N, V, W (1)	✓		✓	✓	✓	✓	4	S	256M	E, I, O	2/8	64M	S1, S2, O	16G	0, 1, 3, 5, 10	S	✓	✓	✓	✓	✓	\$16,820/12	P: 1 R: 16M S: 1G					
AST Research, Inc. (800) 876-4278	Manhattan SMP	P/60	5	D, OS, U, W, O	L, N, S, V, W	✓				✓		4	S	1G	E, I, O	3/19	100M	S2, O	64G	0, 1, 5	S		✓	✓	✓	✓	✓	\$19,607/3	P: 1 R: 16M S: 1G				
Auspex Systems, Inc. (800) 735-3177	NS 7000/200 Series	R/55	6	U	(1)	✓	✓	✓				6	A	514M	O	7/15	440M	S2	61.25G	0, 1, 10	S		✓	✓	✓			\$82,400/3	P: 5 R: 48M S: 3G				
	NS 7000/500 Series	R/55	14	U	(1)	✓	✓	✓				14	A	902M	O	13/37	440M	S1	180G	0, 1, 10	S		✓	✓	✓	✓	✓	\$140,400/3	P: 5 R: 48M S: 3G				
Compaq Computer Corp. (800) 345-1518	ProLiant 2000	8/50, P/66	2	OS, U, W	L, N, S, V, W (1)	✓				✓		8	S	512M	E, O	3/12	1.6G	OP, S2	10G	0, 1, 4, 5, 10	S	✓	✓	✓	✓		\$8,700-\$12,000/36	P: 1 R: 16M-32M S: 1.05G					
	ProLiant 4000	P/66	4	OS, U, W	L, N, S, V, W (1)	✓				✓		8	S	512M	E, O	3/14	1.6G	OP, S2	14G	0, 1, 4, 5, 10	S	✓	✓	✓	✓		\$19,850/36	P: 1 R: 64M S: 2.1G					
Data General Corp. (800) 328-2436	AV 8500	R/45	4	U	L, N (1)	✓	✓	✓	✓	✓	✓	9	S	2G	O	10/20	2G	OP, R, S1, S2	800G	0, 1, 3, 5	S		✓	✓	✓			\$40,995/12	P: 2 R: 64M S: 520M				
	AV 9500	R/50	16	U	L, N (1)	✓	✓	✓	✓	✓	✓	12	S	2G	O	10/20	2G	OP, R, S1, S2	1.1T	0, 1, 3, 5	S		✓	✓	✓	✓		\$84,995/12	P: 2 R: 128M S: 520M				
Digital Equipment Corp. (800) 344-4825	Digital 2100 Server Model A500MP	R/190	4	U, W, O	L, W (1)	✓	✓	✓	✓	✓	✓	8	S	2G	E, P, O	2/11	132M	OP, S2	32G (2)	0, 1, 5, 10	S		✓	✓	✓	✓		\$18,900-\$26,900/36	P: 1 R: 64M S: 1G-2G				
Hewlett-Packard Co. (800) 637-7740	HP 9000 Model T500	R/90	12	U	L, N, V (1)	✓	✓	✓	✓	✓	✓	112	S	2G	O	8/16	900M	OP, S2, O	1.9T	0, 3, 5	S		✓	✓	✓			\$149,000/12	P: 1 R: 128M S: NA				
IBM (800) 772-2227	IBM PS/2 Server 295	8/50	2	D, OS	L, N, S	✓	✓	✓	✓	✓		12	A	10G	O	2/12	20M	S1	10G	0, 1, 5	P		✓	✓	✓	✓		\$23,600/36	P: 1 R: 32M S: 3G				
Integrated Business Computers, Inc. (818) 882-9007	XLB System	P/66	2	U	L (1)	✓		✓				4	S	384M	O	2/15	2.1G	OP, S1	25G	1	P	✓		✓		✓		\$16,000/12	P: 1 R: 32M S: 1G				
Large Storage Configurations, Inc. (800) 831-9482	Integrated Data Server IDS 1000	(3)/33	16	U	(1)	✓	✓					4	A	512M	V, O	2/16	1.2G	OP, S2	1.152T	0, 1, 5	P	✓	✓	✓	✓	✓		\$48,000/3	P: 3 R: 32M S: 4.4G				
Motorola, Inc. (800) 759-1107 Ext. 852	Series 900	R/50	4	U	(1)	✓		✓	✓		✓	15	S	640M	V	1/15	40M	S2	28G	0	S				✓			\$17,546/60	P: 1 R: 32M S: 520M				
NetFRAME Systems, Inc. (800) 352-8726	NF 250	8/50, P/66	5	D, OS, U, O	L, N	✓	✓	✓		✓		3	A	128M	O	2/3	35M	S1, S2	16G (4)	0, 1, 4, 5	P, S		✓	✓	✓	✓	✓		\$22,950/12 (5)	P: 2 R: 16M S: 2.1G			
	NF 250 C/S	8/50, P/66	5	D, OS, U, O	L, N	✓	✓	✓		✓		3	A	128M	O	2/3	35M	S1, S2	16G (6)	0, 1, 4, 5	P, S		✓	✓	✓	✓	✓		\$22,950/12 (5)	P: 3 R: 16M S: 2.1G			
	NF 250 FT	8/50, P/66	5	D, OS, U, O	L, N	✓	✓	✓		✓		3	A	128M	O	2/3	35M	S1, S2	16G (4)	0, 1, 4, 5	P, S	✓	✓	✓	✓	✓		\$22,950/12 (5)	P: 3 R: 16M S: 1.05G				
	NF 450	8/50, P/66	9	D, OS, U, O	L, N	✓	✓	✓		✓		8	A	256M	O	4/8	35M	S1, S2	32G	0, 1, 4, 5	P, S	✓	✓	✓	✓	✓		\$58,950/12 (5)	P: 2 R: 32M S: 1.05G				
	NF 450 C/S	8/50, P/66	9	D, OS, U, O	L, N	✓	✓	✓		✓		8	A	256M	O	4/8	35M	S1, S2	32G (7)	0, 1	P, S	✓	✓	✓	✓	✓		\$73,950/12 (5)	P: 3 R: 16M S: 2.1G				
	NF 450 FT	8/50, P/66	9	D, OS, U, O	L, N	✓	✓	✓		✓		8	A	256M	O	4/8	35M	S1, S2	32G (8)	0, 1, 4, 5	P, S	✓	✓	✓	✓	✓		\$69,950/12 (5)	P: 3 R: 32M S: 2.1G				
Olivetti North America, Inc. (800) 633-9909	LSX5040 E	8/66	4	D, OS, U, W	L, N, S, W (1)	✓	✓	✓	✓	✓	✓	9	S	1G	E, O	2/14	880M	OP, S2	12.6G	0, 1, 5	S	✓		✓	✓	✓		\$12,084/12	P: 1 R: 16M S: 525M				
Plexcom, Inc. (805) 522-3333	Quantum-server 6000 series	8/100	14	D, OS, U, W	L, N, S, V, W (1)	✓	✓	✓	✓	✓	✓	14	S	896M	I, P, O	3/26	2G	S2, O	3.5G	1, 2, 5	S	✓	✓			✓		\$5,000/12	P: 1 R: 8M S: 500M				
Sanyo Icon (714) 263-3777	LANser MMX	P/66	14	U, W	N, W	✓	✓	✓		✓	✓	8	S	2G	I, P, O	2/13	32M	OP, S2	192G	0, 1, 5	P		✓		✓	✓		\$40,000/12	P: 1 R: 64M S: 6G				
Sun Microsystems, Inc. (800) 821-4643	SPARC-server 1000	R/50	8	U	L, N, V (1)	✓	✓	✓	✓	✓	✓	12	S	2G	O	4/4	2G	S2, O	8.4G	0, 1, 10	S			✓	✓			\$47,500/12	P: 2 R: 64M S: 2G				
	SPARC-center 2000	R/50	20	U	L, N, V (1)	✓	✓	✓	✓	✓	✓	40	S	5G	O	10/40	4G	S2, O	52.2G	0, 1, 10	S			✓	✓			\$128,850/12	P: 2 R: 128M S: 11.6G				
Tricord Systems, Inc. (800) 874-2673	PowerFrame ES3000	8/66, P/66	4	D, OS, U, W	L, N, S, V, W (1)	✓	✓	✓	✓	✓	✓	9	S	1G	E, O	2/16	1.7G	OP, S1, S2, O	168G	0, 1, 4, 5, 10	S		✓	✓	✓	✓		\$36,650/36	P: 1 R: 32M S: 520M				
	PowerFrame ES4000	8/66, P/66	6	D, OS, U, W	L, N, S, V, W (1)	✓	✓	✓	✓	✓	✓	9	S	1G	E, O	2/18	1.7G	OP, S1 S2, O	480G	0, 1, 4, 5, 10	S		✓	✓	✓	✓		\$51,650/36	P: 1 R: 64M S: .5G				
	PowerFrame ES5000	8/66, P/66	6	D, OS, U, W	L, N, S, V, W (1)	✓	✓	✓	✓	✓	✓	9	S	1G	E, O	2/18	1.7G	OP, S1 S2, O	480G	0, 1, 4, 5, 10	S		✓	✓	✓	✓		\$78,200/36	P: 1 R: 64M S: 520M				



## Superservers

Company	Product	CPU		Operating systems	NOS	Network adapters							Multi-processing	Max. RAM	I/O bus			Storage			Mgmt. agent	Reliability				Price/Warranty (months)	Standard configuration	
		Type/Top speed (MHz) 8 = 80486 R = RISC P = Pentium	Max. no.			D = DOS OS = OS/2 U = Unix W = Windows NT O = Other	L = LAN Manager N = NetWare S = LAN Server V = VINES W = Windows NT	Ethernet	FDDI	Serial	SNA/SDLC	Token ring			X.25	Max. slots	A = Asymmetric S = Symmetric	(bytes)	E = EISA I = ISA P = PCI V = VMEbus O = Other	Max. no. of busses/ Max. no. of slots		Average bus throughput (bit/sec)	OP = Optical R = RLL S1 = SCSI 1 S2 = SCSI 2 O = Other	Max. capacity (bytes)	RAID levels		P = Proprietary S = SNMP	Uninterrupted power
Tricord Systems, Inc.	PowerFrame Model 20	8/66, P/66	2	D, OS, U, W	L, N, S, V, W (1)	✓	✓	✓	✓	✓	✓	8	A, S	384M	E, O	2/10	712M	OP, S1 S2, O	16G	0, 1, 5, 10	S		✓	✓			\$8,500/36	P: 1 R: 16M S: 520M
	PowerFrame Model 30	8/66	2	D, OS, U, W	L, N, S, V, W (1)	✓	✓	✓	✓	✓	✓	8	A, S	128M	E, O	2/13	848M	OP, S1, S2	22G	0, 1, 10	S		✓				\$18,900/36	P: 1 R: 32M S: 520M
	PowerFrame Model 40	8/66	2	D, OS, U, W	L, N, S, V, W (1)	✓	✓	✓	✓	✓	✓	8	A, S	128M	E, O	2/13	848M	OP, S1 S2, O	44G	0, 1, 10	S		✓		✓		\$23,000/36	P: 1 R: 32M S: .5G
	PowerFrame Model 300	8/100	2	D, OS, U, W	L, N, S, V, W (1)	✓	✓	✓	✓	✓	✓	8	A, S	512M	E, O	2/13	848M	OP, S1, S2	22G	0, 1, 4, 5, 10	S		✓				\$22,900/36	P: 1 R: 32M S: 520M
	PowerFrame Model 400	8/100	2	D, OS, U, W	L, N, S, V, W (1)	✓	✓	✓	✓	✓	✓	8	A, S	512M	E, O	2/13	848M	OP, S1, S2	44G	0, 1, 4, 5, 10	S			✓		✓		\$27,900/36
Unitek Technology, Inc. (909) 930-5700	UT-Server/SMP	8/90, P/66	10	D, OS, U, W	L, N, S, W	✓	✓	✓	✓	✓	✓	10	S	256M	E, I, P, O	12/12	132M	OP, S2	18G	0, 1, 5	S		✓	✓	✓	✓	\$4,450/12	P: 1 R: 16M S: 540M
Wyse Technology, Inc. (800) 438-9973	Series 7000i Model 760MP	8/66, P/66	5	D, OS, U, W, O	L, N, S, V, W (1)	✓	✓	✓	✓	✓	✓	4	S	512M	E, O	2/11	2.1G	S2	15G	1, 2, 5	P		✓	✓	✓		\$10,802/12	P: 1 R: 16M S: 1G

Chart compiled by Cheri Paquet

Products highlighted by color were selected for The Short List.

### FOOTNOTES:

- (1) Supports NFS.
- (2) Maximum storage capacity is 1T byte with extension.
- (3) Uses multiple Motorola 68040 CPUs.
- (4) Maximum storage is 90G bytes with expansion.

- (5) Disk drives are guaranteed for 60 months.
- (6) Maximum storage is 60G bytes with expansion.
- (7) Maximum storage is 210G bytes with expansion.
- (8) Maximum storage is 240G bytes with expansion.

EISA = Extended ISA  
ISA = Industry Standard Architecture  
NA = Not applicable  
NFS = Network File System  
NOS = Network operating system

PCI = Peripheral Component Interconnect  
RISC = Reduced Instruction Set Computing  
RLL = Run Length Limited  
SCSI = Small Computer System Interface

### Continued from page 45

that support multiprocessing. For example, the RISC-based Alpha AXP CPU used in Digital's Digital 2100 Server Model A500MP can top out at 190 MHz, making it the Indy car of the superserver world. The next fastest RISC CPU is the PA-RISC used in HP's HP 9000 Model T500, which has a top clock speed of 90 MHz, compared to the 66-MHz speed of most implementations of Intel's top-of-the-line Pentium CPU.

To ward off sticker shock, many superserver vendors — including Acer America Corp., AST Research, Inc. and Compaq Computer Corp. — provide entry-level models that are configured as single-processor machines for a base price of less than \$20,000. These single-processor machines give users a chance to try superserver functionality for a relatively small amount of money and enables them to upgrade to larger, more potent systems by slipping in more CPUs and storage subsystems as their needs grow.

What makes superservers expandable and truly sets them apart from run-of-the-mill LAN servers is their tiered-bus architecture. In a tiered-bus architecture, multiple CPU and RAM modules are interconnected within the system chassis via a high-speed proprietary system bus. Use of a proprietary system bus typically locks users into a single superserver vendor for CPU and RAM upgrades.

The system bus also connects via vendor-proprietary electrical interfaces to lower speed, industry-standard I/O buses in the same chassis. Those I/O buses support attachment of such peripheral devices as VGA video controllers, Small Computer System Interface (SCSI) and SCSI-2 disk controllers, and LAN adapters to the superserver.

Most superservers already come equipped with any one or all of the following industry-standard I/O buses: Peripheral Component Interconnect (PCI), Industry Standard Archi-

Continued on page 50



## Superservers

The Short List highlights products Network World recommends you examine during the purchasing process for superservers. Products named to The Short List support symmetric multiprocessing (SMP), a tiered-bus architecture, at least 1G byte of random access memory, Redundant Array of Inexpensive Disks (RAID) Levels 0, 1 and 5, and a

Simple Network Management Protocol agent. All of these products offer additional useful features as noted. Your criteria may differ.

### RISC CPU-based superservers:

#### ■ Data General Corp. AV 9500

Data General provides one of the most scalable superservers on the market and tops it off with strong fault-tolerant capabilities. The AV 9500 supports SMP over 16 50-MHz Motorola, Inc. Reduced Instruction Set Computing (RISC) CPUs and includes a system bus that links CPUs and memory at a blinding sustained rate of 2G bit/sec. The AV 9500 can be expanded to support 2G bytes of RAM and can grow to a whopping 1.1T bytes of combined internal and external Small Computer System Interface (SCSI)-2 mass storage. It will also support as many as 12 net interface boards in an external VMEbus. Chief among its fault-tolerant capabilities is the automatic detection, isolation and bypassing of failed CPUs without the need to reboot the server.

#### ■ Hewlett-Packard Co. HP 9000 Model T500

When it comes to on-line storage, this product's 1.9T bytes of SCSI-2 disk arrays is tops. It also supports an impressive 112 network adapter board slots distributed over eight I/O buses. The I/O buses can transfer data at an aggregate rate of 256M bit/sec to as many as 12 90-MHz HP PA-RISC CPUs operating in SMP mode. CPUs and RAM intercommunicate over a 1G bit/sec proprietary Processor Memory Bus. Fault-tolerant capabilities are on par with other vendors.

#### ■ Sun Microsystems, Inc. SPARCcenter 2000

The SPARCcenter 2000 supports as many as 20 50-MHz Super-SPARC CPUs in SMP mode — more CPUs than any other superserver.

The product can be configured with dual, proprietary XDBus system buses that each deliver 640M bit/sec of CPU-to-CPU and CPU-to-RAM bandwidth; up to 2G bytes of shared RAM; up to 40 network adapters spread over 10 I/O buses; and as much as 600G bytes of internal, on-line, differential Fast/Wide SCSI-2 disk arrays. External SCSI-2 disk arrays allow SPARCcenter 2000 CPUs to work with more than 1T byte of data. Its one significant shortcoming is lack of support for RAID Level 5 disk striping with interleaved parity.

### Intel Corp. CPU-based superservers: ■ NetFRAME Systems, Inc. NF 450

Although it does not support SMP, the NF 450 is nonetheless powerful and one of the most scalable Intel-based products on the market. The asymmetric multiprocessing (ASMP) superserver sports a sophisticated modular architecture, tiered-bus design and performance-enhancing features. As many as 9 Pentium- or 80486-based CPUs can be configured as application or I/O servers, each with its own cache memory and RAM. Application and I/O servers intercommunicate as peers within the NF 450 and can continue working even if the main system CPU dies.

The NF 450 can serve as application and communications hubs in heterogeneous corporate computing environments. It comes with a strong graphical user interface-based server management tool called the Server Management and Administration Resource Technology, which eases administration chores.

#### ■ Tricord Systems, Inc. PowerFrame ES5000

Simply put, the PowerFrame ES5000 is an SMP powerhouse. It runs six 66-MHz Pentium or six 66-MHz 80486/DX2 processors in SMP mode, accesses up to 1G byte of shared RAM over a 267M bit/sec system bus, supports up to 480G bytes of on-line SCSI-2 storage and has nine Extended Industry Standard Architecture slots to support network I/O.

Like other members of Tricord's product family, the unit also works in ASMP mode, a unique feature among superserver vendors.

### Honorable mentions:

AST Research, Inc.'s Manhattan SMP and Sanyo Icon's LANser MMX are strong Intel-based products that merit a close look for users that need a high-performance, large capacity product but can do without the fancy features or capabilities listed above.



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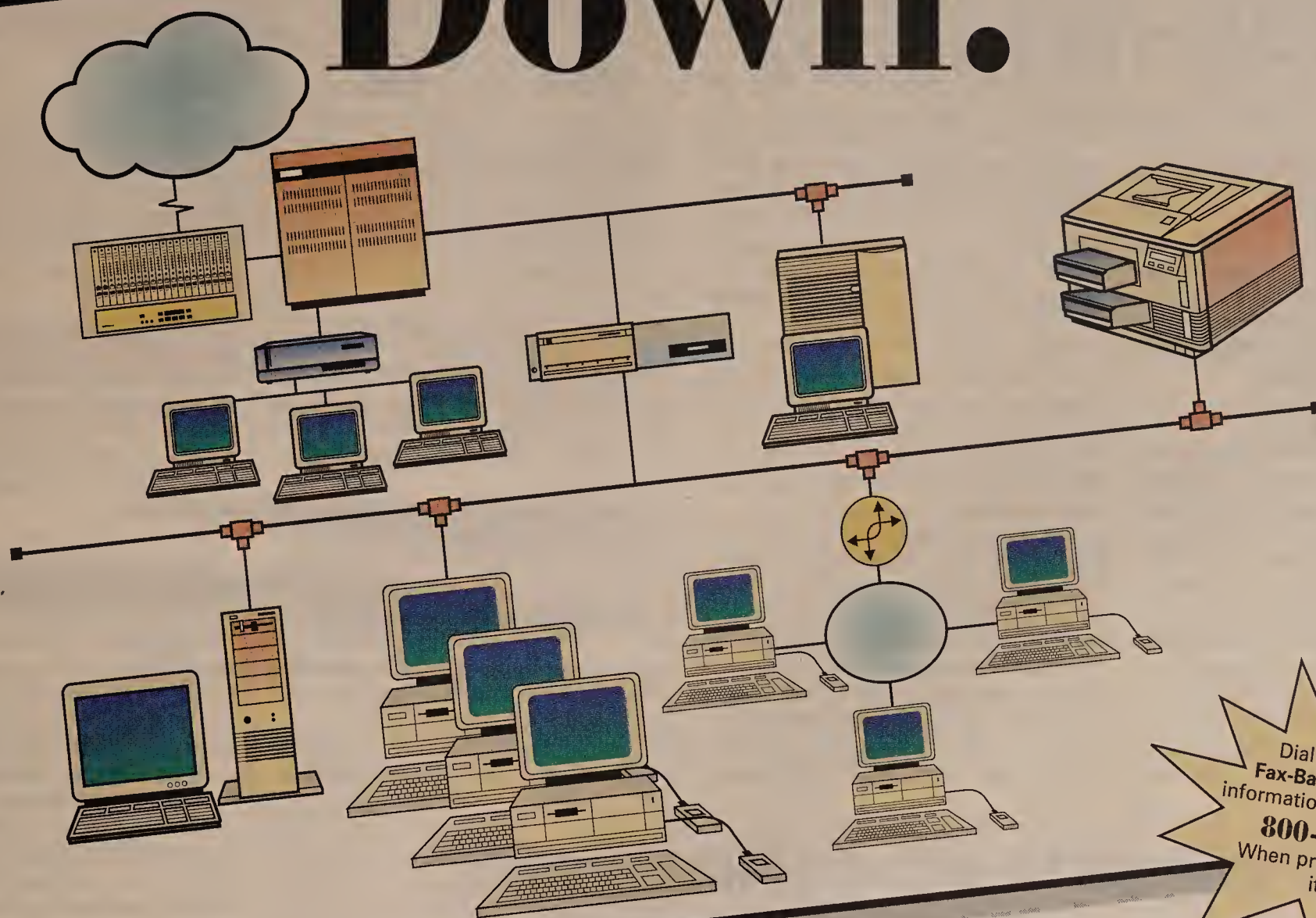
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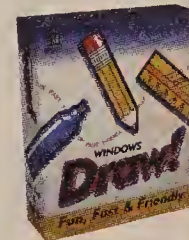
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Continued from page 47

ture (ISA), Extended ISA (EISA), SCSI and VMEbus. The more buses built into a superserver, the greater the number and variety of expansion slots and add-on firmware the server can support (see graphic).

Similar tiered-bus architectures have been incorporated into mainframes and minicomputers for years. Superservers can achieve near-mainframe performance levels by off-loading most disk and net traffic from the main system bus to the I/O buses, as well as by multiprocessing the fastest CPUs on the market.

Standard PCs, by contrast, usually employ a single, all-purpose bus, such as ISA or EISA, to interconnect the CPU, RAM, monitor, disks, LAN adapter and other components. A growing number of Pentium-based units are supporting the high-speed PCI bus. Obviously, the standard PC system bus can become a critical bottleneck as users plug in high-resolution color monitors, disk arrays, Asynchronous Transfer Mode (ATM) network adapters and other data-intensive peripherals.

## MULTIPROCESSING

As users narrow the field, it is wise to first decide whether they want to run existing software or develop new software. Users that want to run existing DOS-, Windows- or OS/2-based software faster will lean toward Intel-based units. Those willing to accept a specialized Unix-based environment that often requires acquisition or development of new applications in exchange for higher performance will gravitate toward RISC-based superservers.

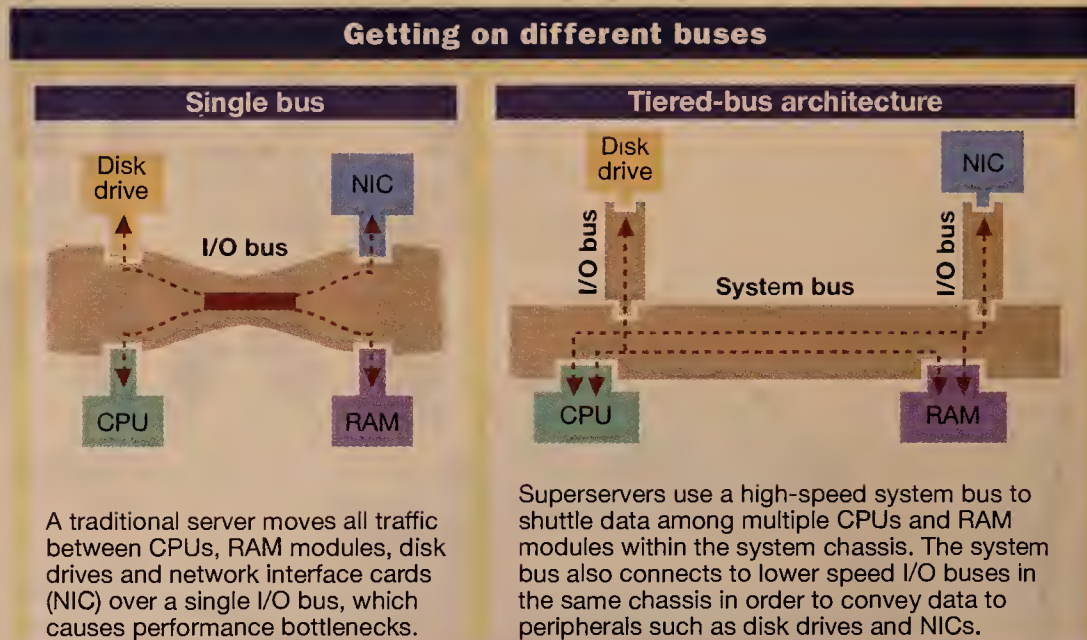
Intel-based systems will run users' vast installed base of Windows, OS/2 and DOS applications, as well as existing Intel-based

NOSes — such as Novell, Inc.'s NetWare — a lot faster. A number of Intel-based superservers will also run Unix variants such as The Santa Cruz Operation, Inc.'s (SCO) SCO Unix and Novell's UnixWare.

Running existing operating systems and NOSes on a superserver will provide a performance benefit over traditional LAN servers largely because this system software can be run without modification in ASMP mode. The operating system and NOS, for instance, can be run on dedicated processors with their own RAM, instead of vying for CPU cycles and RAM on a traditional single-processor server. The superserver will also utilize more RAM and a high-speed system bus to nudge operating system and NOS performance higher. A big disadvantage of ASMP is that tasks cannot be reassigned on the fly to waiting processors as they can in SMP, thereby wasting precious CPU clock cycles and prolonging an application's run-time (see graphic, page 51).

Users with heavy investments in NetWare 3.X for Intel server platforms are strongly advised to focus on Pentium or 486-based superservers, unless they're prepared to convert to NetWare for Unix or some other RISC-capable NOS and throw out or port their existing applications.

Intel-based superservers will provide even greater performance when software vendors roll out SMP-capable versions of their operating systems, NOSes, applications and database management systems. These SMP-capable versions of software unlock the hardware's raw power by breaking processing tasks into a series of subtasks, called threads, and then distributes those threads across multiple CPUs. This procedure boosts performance because



GRAPHIC BY SUSAN SLATER

threads are processed in parallel instead of in sequence.

But SMP has a slender foothold in the world of Intel-based operating systems and NOSes, with only Microsoft Corp.'s Windows NT and SCO's SMP-capable SCO MPX deserving serious attention.

In fact, Windows NT is shaping up to be the SMP-capable operating system of choice for Intel-based superservers, according to Lynn Berg, program director for mid-range computing strategies at Gartner Group, Inc. in Stamford, Conn. Standard versions of Windows NT support SMP over two Intel CPUs, while Windows NT Advanced Server (NTAS) can harness as many as four CPUs in SMP mode.

Windows NT is the first Intel-based operating system to seriously threaten Unix's multi-

processing dominance. Microsoft is encouraging hardware vendors to port Windows NT to larger and larger Intel- and RISC-based servers. It remains to be seen whether Windows NT will scale well to very large multiprocessing systems, but Microsoft's strategic direction is clearly giving the Intel-based superserver market a big boost.

The Corporate Health Club, Inc., a Louisville, Ky., medical insurance firm, is betting on Windows NT's scalability, according to Ray Palazzo, systems administrator. The firm uses Windows NTAS in SMP mode on a three-CPU Wyse Technology, Inc. Series 7000i Model 760MP superserver. The platform currently runs a Microsoft SQL Server risk-analysis application that maintains 20,000 user health profiles and serves 18 Microsoft Windows for Workgroups desktops on a local Ethernet.

By 1996, however, the Windows NT/Wyse superserver will support a maximum of two million profiles on local disk arrays and pull data over local- and wide-area connections from corporate mainframes, minicomputers and servers. "We will reset a software switch within Wyse's flavor of Windows NT to bring all of the machine's five CPUs into SMP mode," Palazzo says.

Windows NT's current SMP support gives it a leg up on OS/2 and NetWare 4.X. However, the benefit over NetWare 4.X may be short-lived, as Novell is expected to roll out an SMP-capable version of its NOS in the first quarter of 1995 (see story, this page).

"There is no advantage to SMP in this market until Novell NetWare supports it," says Mike Maciag, field-marketing product manager at NetFRAME Systems, Inc., which has engineered its entire product line to support ASMP exclusively. As many as nine Pentium- or 486-based CPUs can be configured as application servers or I/O servers that can be plugged into a NetFRAME NF 450.

Application servers are essentially servers on a board, each with their own cache memory and RAM. I/O servers are interfaces to storage devices and network adapters. Application and I/O servers intercommunicate as peers within the NF 450, as opposed to communicating as subsidiary processors under the control of a master CPU, as they would in SMP servers.

But lack of SMP support in NetFRAME products plays a role in some customers' decision to downsize. For instance, Home Savings of America, FSB in Irwindale, Calif., bought NetFRAME superservers when they first hit the market in order to tap their power. Now the company wants to move to SMP but has to move slowly.

Home Savings is currently employing

# Novell's push into multiprocessing may propel superservers

Novell, Inc.'s plans to roll out symmetric multiprocessing (SMP), asymmetric multiprocessing (ASMP) and clustering technologies in NetWare 4.X will make superservers more attractive to cost-conscious net managers.

Under its Distributed Parallel Processing strategy announced last March, Novell will provide versions of NetWare 4.X that will enable superservers to run existing network operating system (NOS), operating system and application software significantly faster. This performance gain could help users cost-justify superserver purchases.

Novell anticipates shipping an optional SMP upgrade for NetWare 4.X by year end, according to Drew Major, the company's chief scientist and system architect. This upgrade will enable NetWare to support multiple threads in which the NOS processes various parts of client requests concurrently and make it possible to distribute application processing chores in real time among multiple CPUs in a single superserver.

Support for SMP will improve NetWare 4.X performance by dynamically spreading the NOS' most CPU-intensive functions including data encryption, media management and communication buffer management across multiple CPUs.

With ASMP capabilities, NetWare 4.X will improve application performance and quickly process less CPU-intensive NOS tasks by executing them on separate processors, thus avoiding the need to share cycles with core NOS functions.

Independent software developers will be able to build SMP-capable NetWare Loadable Modules (NLM) with a

software development kit due out this summer. Existing NLMs will be able to run in single-processor mode in the upgraded NOS — an important consideration for network managers loathe to abandon investments in legacy NLMs.

Multiprocessing will satisfy the requirements of a specific set of users. "Most of the demand for symmetric multiprocessing under NetWare comes from users of database servers, which are CPU-intensive applications that involve a lot of data sorting and analysis," Major says. "Standard NetWare file server applications have no immediate need for symmetric multiprocessing."

Future NetWare upgrades will support different forms of multiprocessing. For instance, NLMs on a server split into multiple NetWare 4.X domains will be processed symmetrically.

Likewise, an ASMP feature for massively parallel NetWare servers will make it possible to dedicate NLMs and application processes to run on specific processors. Lastly, a feature that will enable ASMP within clustered networks of single-processor and multiprocessor NetWare servers will make it possible to dedicate specific NLMs and application processes to run on specific CPUs and machines in a single multiprocessing LAN environment.

These multiprocessing upgrades will also be incorporated in Novell's Processor-Independent NetWare, which is being developed to make it easy to port NetWare 4.X to high-performance Reduced Instruction Set Computing processors, Major says.

**"Standard NetWare file server applications have no immediate need for symmetric multiprocessing."**



superservers in addition to their legacy host computers and are continually reassessing which application and processes will run most appropriately on which platforms. The company is cautiously migrating some applications — such as document imaging, as well as bankruptcy and foreclosure tracking — from IBM MVS mainframes to two NetFRAME 450 superservers, each of which incorporates two Intel 80486 CPUs and runs NetWare 3.12 and Oracle Corp.'s Oracle7 relational DBMS.

NetFRAME's lack of support for SMP is a factor slowing Home Savings' drive to downsize mainframe applications to the superservers, according to Duke Walls, PC/LAN support engineer at the firm. "SMP would be desirable for processing database sorts, indexing and queries, but NetFRAME doesn't support that capability," Walls says. However, the bank does not want to scrap investment in the NetFRAME units.

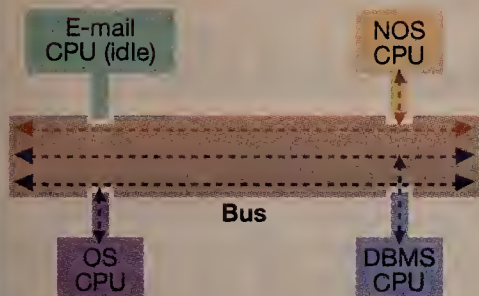
While they are limited in terms of the software they can run, RISC-based superservers clearly outperform Intel-based units. The performance benefit results from the scalability of RISC-based systems and the use of Unix's multiprocessing, multitasking and multithreading capabilities to boost DBMS performance for on-line transaction processing (OLTP) and other CPU- and disk-intensive applications.

Fingerhut Companies, Inc., a Minnetonka, Minn.-based direct marketing firm is benefiting from RISC's scalability. The firm is migrating telemarketing, customer service and other corporate applications from IBM mainframes to four Sun SPARCcenter 2000 RISC-based superservers that run Sun's Solaris Unix-based operating system.

As its processing requirements grow, Fingerhut can add new CPUs, RAM modules and disk drives to the SPARCcenter 2000s at a much lower cost than upgrading existing main-

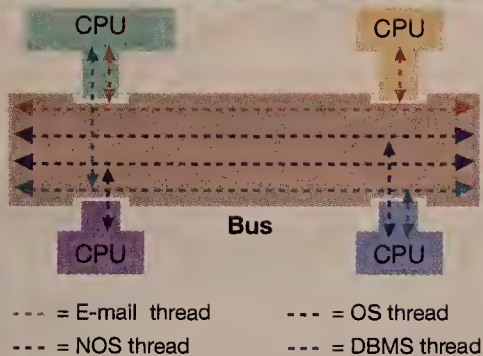
### The multiprocessing difference

#### ASMP superserver



ASMP improves performance over single CPU servers by dedicating a CPU to run one piece of software. But, when the software has no tasks to process, its CPU sits idle.

#### SMP superserver



SMP speeds processing and improves reliability by using software that can create multiple threads, which distribute tasks evenly among all available CPUs, thus balancing the workload.

GRAPHIC BY SUSAN SLATER

A significant development that could spur more widespread SMP adoption is Intel's proposed industry-standard MultiProcessor Specification. The spec provides a standard device-driver interface between operating systems and multiprocessing systems incorporating Intel CPUs. It would allow new multiprocessing superservers to come to market more quickly since hardware vendors would be able to run off-the-shelf operating systems on their systems, rather than have to go to the expense and trouble of customizing operating systems for this purpose (see story, page 52).

RISC-based superservers are constrained by their reliance on sophisticated Unix operating systems, which limits their ability to run existing applications and often requires users to build applications from the ground up. Typically, RISC-based superserver vendors utilize their own Unix variant. For instance, Sun uses its Solaris operating system, while HP uses its HP/UX and Data General Corp. uses its DG/UX.

Each of the Unix variants is capable of running Unix's native Network File System for net file sharing, plus Unix versions of Novell's NetWare, Banyan Systems, Inc.'s VINES and Microsoft's LAN Manager. Digital's Digital 2100 Server Model A500MP is the only RISC-based superserver that runs Microsoft's Windows NT operating system in SMP mode.

Many RISC-based superservers will run Windows 3.1, DOS and other Intel-based software in emulation mode. But this approach usually hinders application performance, compared to running software on native hardware platforms, thereby neutralizing the speed advantage of RISC-based systems.

frames, says Glen Habern, the firm's chief information officer. "This way I can have a much smoother incremental increase in costs, rather than great big steps," Habern says.

In addition to Sun's SPARCcenter 2000, DG's AV 9500 and HP's HP 9000 Model T500 are good examples of scalable RISC-based superservers. They can all grow from modest to massive servers through incremental hardware expansions. Superservers can usually be expanded by adding new CPUs, memory, disk drives and other components to an existing system chassis, as well as by linking or clustering multiple system chassis together via external system bus-to-system bus connections.

Sun's SPARCcenter 2000, which runs Sun's Solaris 2.3, can support up to 20 50-MHz SuperSPARC CPUs in SMP mode. The SPARCcenter 2000 provides dual Sun XDBus system buses that each deliver 640M bit/sec of CPU-

Continued on page 52

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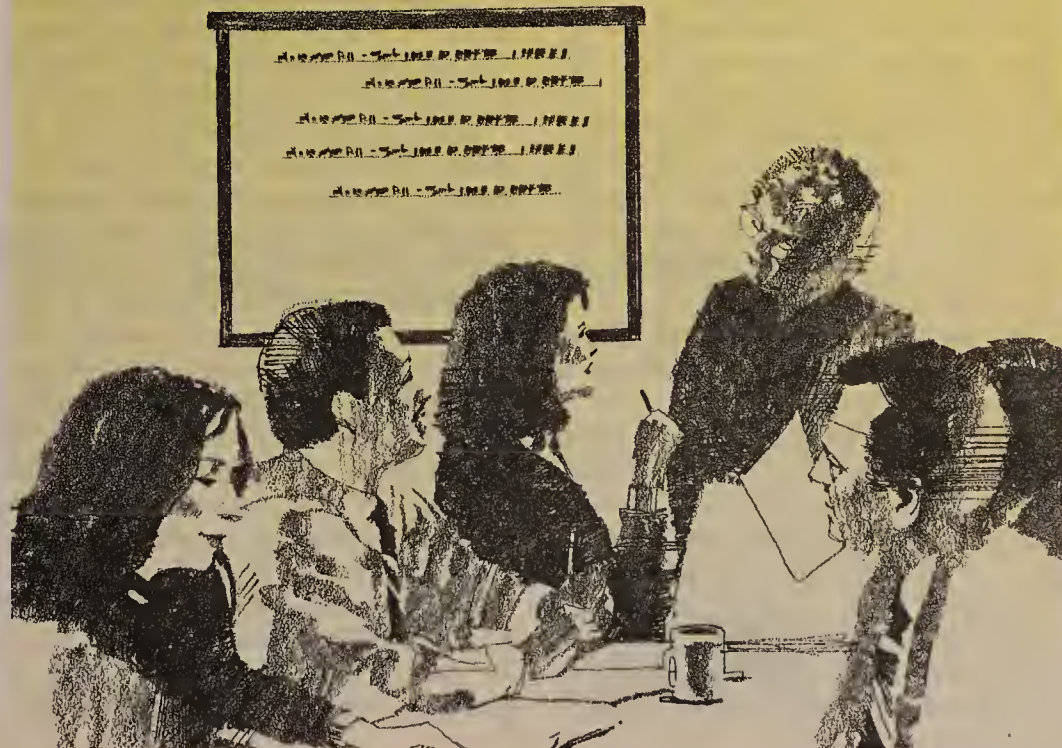
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Continued from page 51

to-CPU and CPU-to-RAM bandwidth, a prodigious amount of internal throughput that helps it make the most of SMP. The product also offers up to 2G bytes of shared RAM and up to 5G bytes of total system RAM; up to 40 network interface slots spread over four 320M bit/sec I/O buses; and as much as 600G bytes of internal, on-line, differential Fast/Wide SCSI-2 disk arrays. External SCSI-2 disk arrays allow SPARCcenter 2000 CPUs to work with over 1T byte of on-line data.

The DG AV 9500's scalability profile is similar. It runs DG/UX and supports SMP over 16 Motorola RISC CPUs. The system bus links CPUs and memory at a blinding sustained rate of 2G bit/sec. The AV 9500 supports up to 2G bytes of RAM, 1.3T bytes of combined internal and external SCSI-2 mass storage, and as many as 16 network interface boards in an external VMEbus chassis.

The HP 9000 Model T500 supports the most on-line mass storage of any RISC-based superserver — up to 1.9T bytes on SCSI-2 disk arrays. It is also the most expandable, offering room for 112 net interfaces spread over eight I/O buses. The I/O buses can transfer data at an aggregate rate of 256M bit/sec to as many as 12 HP PA-RISC CPUs operating in SMP mode. CPUs and RAM intercommunicate over HP's 1G bit/sec Processor Memory Bus.

The HP 9000 Model T500's emphasis on high-volume disk I/O reflects HP's focus on serving traditional MIS customers, according to Scott Emo, the company's product-line manager for high-end systems. "Ninety-five percent of [the HP 9000 Model T500 models sold] go into data center environments as an alternative to mainframe-based computing," he says.

RISC-based superserver capacity metrics, such as processor, bus and disk configuration, provide a good first approximation of a system's performance in real-life applications. However, superserver performance is best assessed in a test lab environment using a hardware and software configuration close to your target application.

Network managers should not give too much credence to vendor-supplied RISC-based superserver benchmarks and should always inquire into the precise test application and system configuration used to generate the numbers. If a superserver has been optimized for SMP, the vendor may advertise glowing performance based on the System Performance Evaluation Cooperative's (SPEC) SPECint92 or SPECfp92 benchmarks.

SPECint92 measures how long it takes the CPU to read and write information to RAM when performing operations on integers, which are whole numbers, while SPECfp92 measures the same type of efficiency during floating-point operations. However, your target application may stress high-volume network I/O or disk reads, which require the use of other benchmarks.

Net managers can employ three rules of thumb when assessing the performance of RISC-based superservers.

First, concentrate on SMP-capable superservers, a category that includes most RISC-based systems. Of the RISC-based vendors listed in the Buyer's Guide chart starting on page 46, only Auspex Systems, Inc. does not support SMP.

Next, determine which SMP-capable operating system, NOS, DBMS and application development tool kits work with which super-

server platforms. Applications must be designed with multiple execution threads in order to run at maximum efficiency in SMP mode. Fortunately, most Unix variants running on RISC-based superservers are strong in the multithreading department, and 32-bit NOSes that have been adapted for Unix-based SMP — such as Novell's NetWare for Unix and Banyan's VINES SMP — are well worth exploring. Likewise, such companies as Oracle,

Sybase, Inc. and Informix Software, Inc. are now providing SMP-capable 32-bit Unix DBMSs and application tool kits.

Lastly, configure the superserver to optimize performance of your principal applications, recognizing that the optimal configuration may change as your network environment evolves. For example, if you plan to use the machine as a high-volume file server for thousands of users, you might want to configure it to provide efficient disk and network I/O functions,

instead of lots of fast CPUs, says Gartner Group's Berg. "Typically, there is no more than a 20% load on file-server CPUs," she says.

For example, a superserver optimized for file services could safely be outfitted with two CPUs and 32M bytes of shared RAM, which should be more than enough. However, it should certainly be configured with a high-throughput disk subsystem and ample LAN interfaces to support fast file retrieval and delivery. Such a disk subsystem could consist of RAID drives, a dual-channel SCSI-2 disk array controller with 1M bytes of on-board disk cache and a 20M bit/sec data-transfer rate. In such a case, you would want to pay greater attention to RISC-based superserver vendors with strong storage management product lines, such as DG, HP and Sun.

If you decide instead to use the superserver for CPU- and network-intensive applications, such as real-time supercomputer process visualization, you would want to use SMP in conjunction with more CPUs, fast cache memory and shared RAM — and perhaps high-speed LAN interface boards such as Fiber Distributed Data Interface or ATM.

None of the RISC-based products in the Buyer's Guide chart provides ATM adapters yet. Auspex, DG, Digital, HP and Sun provide FDDI interfaces. However, widespread vendor adoption of high-speed PCI and VMEbus I/O bus standards means that third-party ATM and FDDI adapters will generally work with any RISC-based superserver.

You can apply these same rules of thumb when estimating the real-world performance of today's Intel-based superservers, which lag well behind the RISC segment in this area.

But in general performance terms, Tricord's PowerFrame ES5000 and AST Research's Manhattan SMP could be considered Intel-based SMP muscle machines. The PowerFrame ES5000 runs six 66-MHz Pentium or six 66-MHz 486/DX2 processors in SMP mode, accesses up to 1G byte of shared RAM over a 267M bit/sec system bus, supports up to 480G bytes of on-line SCSI-2 storage and has nine EISA bus slots to support network I/O. The Manhattan SMP supports five Pentium CPUs in SMP mode, utilizes a 200M bit/sec system bus, up to 1G byte of shared RAM and up to 32G bytes of on-line SCSI-2 storage.

A superserver that performs SMP over 10 or more Intel 80486 CPUs could equal or exceed the Pentium-based PowerFrame ES5000 or Manhattan SMP in raw processing power. Plex-

com, Inc.'s Quantumserver 6000 Series supports as many as 14 80486 CPUs, and Unitek Technology, Inc.'s UT-Server/SMP maxes out at 10 80486s.

However, none of these machines supports more than 900M bytes of shared RAM, which could create a performance bottleneck as more 80486 CPUs are pressed into use.

## TOLERATING FAULTS

Providing high performance and capacity isn't much good if the superserver fails frequently. That is why Intel- and RISC-based superservers provide advanced fault tolerance capabilities.

In both market segments, you'll find widespread adoption of redundant power supplies; RAID drives; hot-swappable disk drives; error-correction code (ECC) memory that maintains the integrity of data in RAM; and Simple Network Management Protocol agents.

Consequently, net managers can count on more than 99% availability from a well-configured, well-managed superserver — on par with trusty old mainframes and minicomputers.

Intel-based superservers' emphasis on ASMP may give those servers a slight reliability advantage over RISC-based systems, though. ASMP is often implemented in a loosely coupled server architecture in which CPUs work on different tasks and can be configured to continue operations unimpeded when their peer CPUs fail.

By contrast, SMP is implemented in a tightly coupled fashion in which a master CPU controls the operation of the others. If the master CPU fails, it can no longer dispatch tasks to other processors, which will cause the superserver to crash.

One of the fundamentals of non-stop computing is steady, clean, reliable power that can be provided through a judicious combination of uninterruptible power supplies (UPS) and backup battery power. All Intel- and RISC-based superservers will work with third-party UPSs purchased separately but some vendors including Acer, Compaq, Integrated Business Computers, Inc. and Olivetti North America, Inc. bundle UPSs in the cost of their systems.

Continued on page 54

# Spec to broaden OS, platform choices

**An emerging Intel Corp. specification promises to break the tight bond between symmetric multiprocessing operating systems and the hardware platforms they run on, thus ending the need to buy everything from the same vendor.**

**Announced last April, Intel's MultiProcessor Specification Version 1.1 would allow symmetric multiprocessing (SMP) operating systems to work on a wide range of superserver hardware platforms.**

**Currently, superserver vendors offer a proprietary SMP operating system that is typically a Unix variant and has been customized to run on its hardware platform only.**

**The MultiProcessor Specification defines an open device-driver interface between operating systems and multiple Intel Pentium or 80486 CPUs contained in the same system chassis. It eliminates the need to change a server's basic I/O system circuitry and hardware interface when a new SMP operating system is installed. It also maintains compatibility with existing application software.**

**Intel developed the MultiProcessor Specification in cooperation with server manufacturers, basic I/O system hardware suppliers and operating system vendors. Should it gain widespread acceptance by superserver and operating system makers, the specification will allow new multiprocessing servers to come to market more quickly, stimulate technical innovation in superservers and further improve superserver price/performance.**

**Users will benefit from an increasing number of superserver options as well as the ability to mix and match heterogeneous SMP hardware and software, regardless of the vendor.**

**The MultiProcessor Specification has been embraced by many operating system and network operating system vendors. It will be incorporated in Microsoft Corp.'s Windows NT, Novell, Inc.'s NetWare and UnixWare, IBM's OS/2 for symmetric multiprocessing and The Santa Cruz Operation, Inc.'s SCO MPX. Even SunSoft is using the specification to develop a new version of Solaris, which has up to now been restricted to running on Sun Microsystems, Inc.'s Reduced Instruction Set Computing (RISC)-based machines.**

**"We expect multiprocessor systems, operating systems, and [basic I/O system hardware] that support the MultiProcessor Specification to be broadly available early in the second half of this year," says Ron Whittier, Intel's senior vice president.**

**The spec may make superservers built on Intel microprocessors a more formidable alternative to RISC-based SMP systems, which still generally outperform their Intel-based counterparts. Intel is doing a service to the superserver market by "bringing all [Intel-based] system vendors up [the SMP learning curve at the same time]," according to Lynn Berg, director of mid-range computing strategies at the Gartner Group, Inc. consultancy based in Stamford, Conn.**

**It's not clear if a similar specification will be introduced into the RISC-based superserver market. Intel geared the spec to its own microprocessors but says it would not discourage other firms from adapting it for RISC-based machines.**



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# Reader views on superservers

Based on 100 interviews.

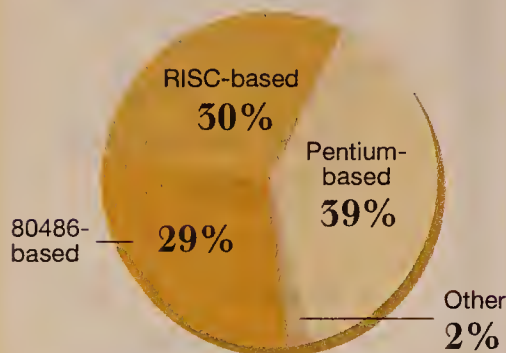
## What key business goals compelled/will compel you to purchase superservers?

Highest score is 3.

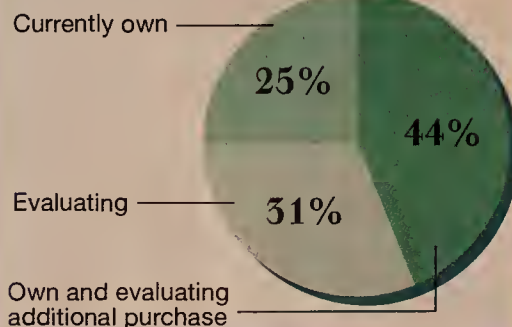
To improve performance, security and manageability of existing LAN-based applications	2.18
To migrate existing LAN-based server applications to a more powerful platform	2.09
To downsize existing mainframe and minicomputer applications to LAN-based servers	2.09

## What type of superserver do you plan to purchase in the coming year?

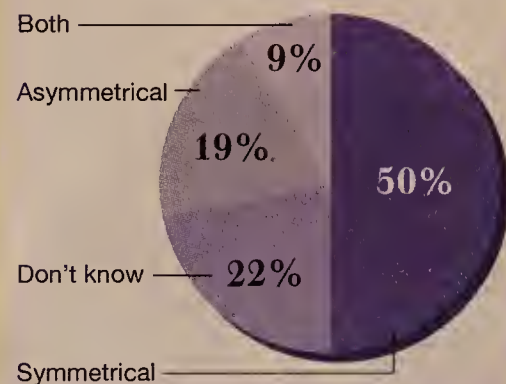
(Based on 64 responses.)



## Do you own/plan to buy a superserver incorporating RISC, Intel Pentium or Intel 80486-based CPU(s)?



## Did you/will you buy a symmetrical or asymmetrical processing product?



## For what purpose do/will you use your superserver?

(Multiple responses allowed.)



## Superserver selection criteria

Highest score is 7.

Conformance to standards	5.07
Performance benchmarks	4.71
Scalability	4.44
Price/performance	4.43
Fault tolerance	4.34
Server management capabilities	3.19
Range of OS and NOS support	2.72

## Key service and support issues

Highest score is 3.

Ease of maintenance	1.38
Technical support	1.35
Next day availability of replacement parts and units	.89
Integration services	.81
Ease of installation	.68
Remote diagnostic monitoring	.63
Toll-free hotline	.30

**Focus Data, Inc., an independent market research firm in Framingham, Mass., conducted the survey. Focus Data specializes in gathering primary data from end-user organizations regarding their enterprise network environment and needs. For more information on Focus Data services, call Mona Dabbon at (508) 626-2556.**

GRAPHIC BY SUSAN SLATER

Continued from page 52

Many vendors also support multiple backup batteries, which can be pressed into action when commercial power is lost or UPS power is depleted. Many also support automatic power supply fail-over, which is the ability to automatically switch to a backup battery when the primary power source is gone.

Another important reliability feature found widely in both market segments is redundant mass-storage devices, which guard against dreaded disk crashes. RAID support is a popular way to provide redundant mass-storage with most vendors supporting RAID Levels 0 for data striping, 1 for disk mirroring, and 5 for data striping with interleaved parity. RAID Levels 1 and 5 ensure that data can be recovered rapidly when primary disks are lost. A growing number of vendors are offering RAID Level 10, which is simply a combination of RAID Levels 1 and 0 that provides mirroring of striped disk arrays.

One drawback to RAID Levels 1 and 5 is the requirement to invest in more on-line storage disk capacity than is required for normal server operations. RAID Level 1's support for disk mirroring requires double the amount of disk space to make sure the contents of a failed disk can be stored on spare capacity on another. RAID Level 5 uses a parity error-checking mechanism that makes it possible to reconstruct lost data. With parity, all the bits in a data file are added up with the sum used to create a unique string of data that is 20% to 40% the size of the original file but can be used to reconstruct the whole file.

RAID Level 5 has another disadvantage; it is a slow performer on data updates because it requires that overhead parity bits be written to disk arrays in addition to actual data. A growing number of vendors are speeding up RAID Level 5 by writing data and parity bits first to fast cache memory on subsystem controller boards and then subsequently applying the updates to disk. Writing to fast cache frees the CPU more quickly. The fast cache buffers data until it can be written to disk.

Net managers who invest in RAID Levels 1 or 5 should also explore a widely supported capability known as hot disk swapping. This feature lets failed internal or external disk drives be removed and replaced with working drives while the superserver remains on-line.

Superserver CPU and memory modules have also been known to fail, which is why vendors provide such esoteric but near-universal features as ECC RAM, parity-checking buses and automatic recovery from hardware faults. These fault-tolerant features have traditionally been found in mainframes and high-end OLTP systems. For example, DG's AV 9500 and AV 8500 can support heavy-duty OLTP through their ability to automatically detect, isolate and bypass failed CPUs — downgrading, for example, from four-way to three-way SMP without the need to reboot.

In addition to providing an array of fault tolerance features, superserver vendors are offering a range of software-based server management tools that run on dedicated administration consoles. Users should evaluate server management tools for their user friendliness, the range of functions supported, and their integration with firms' existing enterprise net and systems management platforms.

Fortunately, all RISC-based and most Intel-

based superservers include bundled industry-standard SNMP agents to facilitate remote management from SNMP-compliant network management systems. Some vendors also install proprietary management agents in superservers.

Among the RISC-based vendors, DG, Digital, HP and Sun provide the richest management tool kits.

These companies' tool kits support environmental monitoring, alarm capture, diagnosis, error logging, configuration management, performance optimization and storage management. Not surprisingly, their tools also have hooks into their respective network management systems.

Several Intel-based superservers also come with sophisticated, graphical user interface (GUI)-based server management utilities that run on the administration console. Some noteworthy GUI-based management tools include Compaq's Insight Manager, NetFRAME's Server Management and Administration Resource Technology and IBM's PS/2 ServerGuard Maximum Availability and Support System.

The Intel-based vendor community is actively promoting a systems management standard — the Desktop Management Task Force's Desktop Management

Interface (DMI) — which will streamline centralized monitoring and control of superserver CPUs, disk drives and other components. Intel has championed DMI, and several Intel-based server vendors, including AST Research, have jumped on the bandwagon in pledging support for it.

DMI would require special agent software to be installed on the superservers and other desktop devices to be managed. It would also entail creation of Management Information Files (MIF) for computer hardware and software components. MIFs are similar to SNMP Management Information Base (MIB) objects. The DMI standard is complementary to SNMP, which lacks MIBs for end systems such as servers and desktops.

## LOOKING AHEAD

Superservers are the shape of tomorrow's networked enterprise computing. Users should not let sticker shock get the better of them when exploring the superserver market. RISC- and Intel-based superservers are expensive, but they can more than pay for themselves by consolidating multiple traditional servers in one box, decreasing network downtime and improving application performance.

During the remainder of this decade, superservers will continue to scale up to rival the largest mainframes and minicomputers, and will offer an expanding set of fault tolerance and systems management features.

Superserver technology will also scale down. In fact, before this decade is over, it won't be surprising to find superserver features such as multiprocessing, tiered buses, fast disk arrays, hot-swappable components and ECC memory as standard fare on even run-of-the-mill LAN servers.

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# Novell's AppWare shows early promise

BY MARK GIBBS

**N**ovell, Inc.'s AppWare is still quite young and not yet complete, but it demonstrates potential. Our first in-depth look at AppWare reveals an ambitious attempt to address the myriad issues associated with developing network-enabled applications. We were able to create applications with little difficulty and found that, on many counts, AppWare is a success. However, it still lacks a key component — a distributed object management system (DOMS).

DOMS was part of the original AppWare blueprint, but, to date, has not come to fruition. The result is an application development platform that allows developers to create object-oriented applications on different hardware platforms. Unfortunately, without DOMS, there is no network transparency and applications must reside on their respective platforms.

Novell's previous forays into the realm of application development have been restricted to a few specific areas. It has offered software developer's kits (SDK) for creating NetWare-aware applications for DOS, Windows and Macintosh environments. It has also offered SDKs to allow developers to create NetWare server-based applications and to access network services such as messaging.

AppWare is different, however. Novell's intention is for AppWare to provide the structure necessary for supporting sophisticated network application development — applications that can be ported to multiple platforms on different networks without any reengineering.

With AppWare, corporate IS groups will be able to build customized, cross-platform application suites that truly match the objectives and business processes of their organizations. Because the construction of applications is based on AppWare Loadable Modules (ALM) — large, easily managed units of code — the development and maintenance costs should be quite acceptable.

Even better, the costs and difficulty of modifying AppWare generated code stack up favorably to alternative development methods. ALMs hide the complexity of applications while an easy-to-follow graphical interface makes it easy to understand, and if necessary, change an application's flow of control.

## TWO DOWN, ONE TO GO

AppWare is actually made up of three separate components — Visual AppBuilder, the AppWare Foundation and a distributed object management system.

The AppWare Foundation and Visual AppBuilder are two different approaches that allow applications to be developed under, and ported to, most of the graphical user interface (GUI)-based operating system and network environments. Most developers will use Visual AppBuilder, which was developed by Serius Corp., a company that has since been acquired lock, stock and source code by Novell.

Visual AppBuilder, as its name suggests, is a graphical appli-

It's enough  
to get  
developers  
started, but  
AppWare  
still needs a  
distributed  
object  
management  
system to  
make it  
whole.

cation development environment. Using Visual AppBuilder does not involve the procedural programming techniques associated with third-generation programming languages, such as C or Visual Basic (see story, page 56). It's fairly simple to learn and can be used to produce reasonably complex applications, but it will take Novell some time yet before users can implement Visual AppBuilder on a broad range of platforms to provide application portability.

The AppWare Foundation is a set of libraries that provide standard functions that can be used on multiple platforms. It provides a common set of applications, a GUI and network services for applications running on multiple platforms.

This AppWare component is far more sophisticated than Visual AppBuilder and provides much greater application portability, but, at the same time, it requires a bit more expertise from users.

The AppWare Foundation is not for neophytes or casual users. Rather, it is a sophisticated tool kit designed for experienced C and C++ programmers. Both Borland International, Inc. and Apple Computer, Inc. support the AppWare Foundation, meaning that they plan to extend the supported services. This commitment ensures that a broad range of portable features, such as support for Apple's Open Collaboration Environment (AOCE) will become available to programmers using the AppWare Foundation. For organizations looking to build complex cross-platform applications, the AppWare Foundation ranks as one of the most promising tool kits available.

Novell is currently in the third beta release of Visual AppBuilder for both Apple Macintosh and Microsoft Windows systems. This product is available to developers through Novell's Professional Developers Program, with a general release scheduled for later this year.

The AppWare Foundation, on the other hand, is in commercial release and is available for Microsoft Windows, HP-UX, SunOS, UnixWare and Macintosh platforms.

The third component of AppWare, which was intended to provide the infrastructure for supporting and managing distributed object-based systems in the

Continued on page 56

**Product:**

AppWare

- ▶ Visual AppBuilder (developers' beta release)
- ▶ AppWare Foundation Version 1.80

**Key findings:**

- ▶ DOMS component is not available.
- ▶ Visual AppBuilder provides an easy-to-use graphical interface.

**Requirements:**

Visual AppBuilder for Windows

- ▶ 80386-based system or higher
- ▶ 4M bytes of memory
- ▶ 23M bytes of disk space

AppWare Foundation (for Windows)

- ▶ 3.1M bytes of disk space for base component and development environment
- ▶ 9M bytes required for optional components

**Vendor:**

Novell, Inc.  
225 East 900 South  
Provo, Utah 84605-0330  
(800) 277-2717



# Reusing code: programming hand-me-downs

Today, most programming projects are executed in what are called third-generation languages, such as COBOL, C, FORTRAN and BASIC. These languages are procedural in nature.

Developing in-house applications with third-generation language requires a commitment of resources to analysis, design, development, debugging and fine-tuning. But that's not all. Modifying code to meet new business objectives or to accommodate new application environments will require that much of the code be rewritten. If the code isn't rewritten, bugs will likely surface due to the interdependency of the application components. One programming concept that eases the burdens and the costs of creating and modifying applications is reusable code.

Reusable code has existed for a long time in the forms of function and subroutine libraries — important features of third-generation language development systems. Items in a library consist of chunks of code that perform fairly small, but common operations, such as file access and terminal-type selection. These functions are relatively simple operations that are carried out in, at most, a few hundred lines of code. They are sometimes referred to as fine-grained functions.

Though these fine-grained library functions save programmers some development effort, applications are still built from hundreds or thousands of library functions. The cost savings are usually not that significant.

Obviously, it is preferable to have more effective reusability — in the form of coarser grained functions that perform more complex operations.

One answer to these problems are fourth-generation languages, which use menu-driven programming to define the functions of a program. Fourth-generation language technology is used to create systems such as reporting, menuing and forms-based applications. Unfortunately, fourth-generation tends to be appropriate for well-defined tasks. For general-purpose application development, particularly in network environments, fourth-generation languages are typically not robust enough.

Another, and perhaps more important, shortcoming is their lack of extensibility, which is required to cope with the vast array of network services available.

So what's the appropriate remedy? Currently, the popular answer to the problems of building flexible, reusable code is object-oriented programming systems (OOPS), which lies at the heart of Novell, Inc.'s AppWare.

Objects are software modules that contain both code (called methods in OOPS-speak) and data (variables and static data). Objects can represent anything from a simple calculator, or a basic file-transfer service, to databases and transaction processing services.

Novell has chosen not to implement objects in what OOPS purists would consider a complete and proper object-oriented manner. The major missing ingredient is classes, which allow new objects to be defined hierarchically — letting them share and extend the attributes of parental objects. The lack of classes can be considered an omission. But the other side of the coin is that the lack of classes simplifies the development process. Working with objects is a less complex endeavor, and the learning curve confronting programmers is not nearly as steep.

## Continued from page 55

NetWare environment, has been quietly shelved. The idea behind NetWare for DOMS, the distributed object management system, is to make the network transparent to distributed applications built under the other AppWare components. While the idea is a very powerful one, it still hasn't evolved beyond vaporware.

DOMS is intended to allow objects in a distributed network environment to exchange data in a secure and manageable way, making the network invisible, in effect, to object-based applications and, more importantly, to programmers. The location of the target object, communication method, security validation and conversion between data formats used by the different platforms are all handled by DOMS.

NetWare for DOMS was based on the Hyperdesk DOMS product from Hyperdesk Corp., a company that Novell has a 10% stake in. Hyperdesk DOMS was based on the Object Management Group's Object Request Broker specification. Earlier this year, however, Hyperdesk announced that it was abandoning the DOMS business due to lack of revenue and was entering the work flow market. This has left the NetWare for DOMS project somewhat up in the air as Novell looks for a replacement technology.

## GETTING STARTED

Visual AppBuilder for Windows requires a minimum of a 386-based system with 4M bytes of random-access memory running Microsoft Windows 3.0 or greater. A minimum of 23M bytes of free disk space is required. Novell recommends using a 486 with at least 8M bytes of RAM.

On the Macintosh side, at least a 68030-based Macintosh with a minimum of 3.5M bytes of RAM — a 68040-based Macintosh with more than 4M bytes of RAM is recommended — and 30M bytes of hard disk storage are required. Macintoshes should be running System 6.0.2 or higher. System 7.0 or higher is strongly recommended, however.

The AppWare Foundation's system requirements are dependent upon whether its installed on a Macintosh, Windows, or Unix platform. On a personal computer running windows, for instance, it requires a minimum of 3.1M bytes of disk space for the base components and the development environment. Another 9M bytes is needed for optional components.

## GOING MODULAR

Under AppWare's Visual AppBuilder, objects are called AppWare Loadable Modules, or ALMs. Unlike the limited capabilities of third-generation language procedures, ALMs support complex functions such as opening, sorting and reporting on a data file. The AppWare Bus, a run-time engine, binds the ALMs together and manages the flow of control.

The AppBuilder ALMs provide access to application features, such as menus, windows and buttons, as well as services such as printers and databases. In the future, Novell plans to provide access to more sophisticated services, such as global naming services including the NetWare Directory Services and, potentially, Banyan Systems, Inc. VINES StreetTalk.

Currently, a number of ALMs are supplied with Visual AppBuilder. They fall into one of three categories — client-specific

functions, data access services and communications services. To date, these ALMs have been implemented for both Macintosh and Windows environments, allowing users to transfer development projects from one platform to the other with a recompile.

Visual AppBuilder's client-specific functions include GUI services, such as windows, buttons, menu bars and cursors. In addition, they include internal application functions, such as loops, text services and calculations.

The data access ALMs support access to flat files and simple databases as well as access to Oracle SQL servers and Open Database Connectivity databases. These ALMs also support a powerful image manipulation service and Novell's Tuxedo transaction processing system.

The ALMs in the communications services group support basic functions, such as printing and serial communications. Other ALMs in this group provide NetWare MHS support, Application System/400 connectivity services, and 3270 and 5250 terminal support.

If necessary, developers can create their own ALMs, though this can be a complex task that will, undoubtedly, deter many. Visual AppBuilder comes with an ALM creation tool kit that allows users to create ALMs using C or C++. The difficulty is that custom ALMs must be created for each target platform. Fortunately, Novell supplies comprehensive directions that ease the process a bit.

## IT'S A VISUAL THING

Visual AppBuilder implements a fairly intuitive graphical development interface. Although at first blush it appears quite similar to Microsoft's Visual Basic, Visual AppBuilder is profoundly different.

The Visual Basic development model is based on visual components that are linked through procedural, third-generation language code. Novell's Visual AppBuilder, on the other hand, addresses not only the creation of GUI objects (such as ALMs), but it also allows users to create the code visually. That is, users can select the ALMs and functions from palettes of icons. Values associated with variables are set and the connections between processes are specified by dragging a line from one process to another.

This same development methodology applies to all of the application components available as ALMs. And, along with this simple application construction comes cross-platform portability. A functionally equivalent application can be generated for all environments simply by moving the files that define an application to other platforms and generating executables on them. At this time, however, portability exists only between the Windows and Macintosh environments, but Novell has unspecified plans for other platforms — notably Unix.

When constructing an AppWare application with Visual AppBuilder, developers create projects containing one or more subjects. Subjects are modules within the application that define reusable sections of applications, such as menu bars or particular window layouts. The idea behind using multiple subjects in a project is to make large projects more manageable by breaking the structure into smaller pieces.

The actual construction process is initiated by dragging ALMs from the ALM palette — a subwindow of ALM icons — into a

subject's window. ALMs can also be formed into groups within subjects to form logical collections of ALMs. This grouping scheme makes it easier to understand the individual components of program constructs, such as menu bars, menus and menu items, as well as the whole AppWare program structure.

Many ALMs are configurable. Configuration can be done at either design time or at run time. For example, the Message Handling Service ALM can be configured for a specific user's MHS environment with such attributes as username and preferred application specified. ALM configuration can be done during the application construction process or at run time.

Window ALMs have the greatest number of configurable attributes. This configuration is performed with a graphical design tool that allows users to place, size and configure all of the elements required in an application window. Developers double-click on the window object to enter the editor that allows them to define the features and layout of an application's window.

Once the user exits the editor and returns to the project window, all of the ALMs, such as buttons and menus, specified for the window will be automatically grouped with the Window ALM.

## PUTTING THE WHEELS IN MOTION

Once an ALM has been added to a subject, it needs to perform some function. If ALMs are the nouns of this application development environment, ALM functions are the verbs. They represent specific actions, which are triggered by events — generated by either the operating system or by other ALMs.

Alongside the ALM palette is the function palette, which allows users to drag desired functions into the subject window. To connect an ALM to a function, users point and click on the ALM and drag a line to the desired function. On a simple level, an application developer can, for instance, connect a menu item such as an Exit option to the function that terminates an application.

These links represent events that occur in the application or the operating system, and are called signals in Visual AppBuilder. An ALM or a function might generate different signals in response to different events. For instance, the NetWare MHS ALM can generate two signals — Mail Arrived and Polling Error (a signal that indicates something has gone wrong). When designing their applications, developers can route the Poll-

## HOW WE *did it*

**We installed Visual AppBuilder on a 33-MHz Intel Corp. 486-based PC with 20M bytes of RAM running Microsoft Corp. Windows for Workgroups Version 3.11 and DOS Version 6.0. We also installed Visual AppBuilder on a Compaq Computer Corp. 486/C portable PC. The PCs were connected to a Compaq ProLiant 1000 server and a Compaq Pro-Signia server, which both ran NetWare 4.01.**



ing Error signals to a notification function in order to warn end users of problems.

Functions can also be linked to other functions, thus forming chains of operations. When, for instance, the MHS ALM detects new mail, a Mail Arrived signal can be sent to a notify function so that a warning message is displayed. After displaying the message, the notify function can send an After Alerting signal to the Get Stored Dirs function (this identifies the directories where messages and attachments are stored). At this point, an After Getting signal can be sent to yet another function.

These function chains represent the logic flow in a Visual AppBuilder program. Program logic is portrayed graphically in the subject windows: the chains of signals from left to right between functions; data flow from top to bottom within functions. The parameters displayed on the top of each function icon are the function's inputs and those at the bottom are the outputs.

During our evaluation of Visual AppBuilder, we created a file storage and retrieval application based on Novell's MHS. We were able to get the MHS-compliant application up and running within two hours — a pretty good time considering that we started from scratch.

## SPREADING THE GOSPEL

The engineers at Novell have some pretty ambitious plans for AppWare. First of all, they plan to extend support for the AppWare Foundation to Sun Solaris, Windows NT, IBM AIX and Windows NT environments.

In addition, Novell's recent acquisition of

WordPerfect Corp. will also impact the AppWare product line. Novell and WordPerfect have announced that all WordPerfect application suite components will be implemented as ALMs, allowing developers to more easily integrate WordPerfect functions into their applications.

The integration of WordPerfect ALMs with AppWare would be a boon for programmers and developers. For example, developers would have the flexibility to allow word processing services to read (and save) files to specific subdirectories while, at the same time, preventing end users from defining their own

macros.

So what's AppWare's potential impact? Well, AppWare has the potential to be an industry-transforming application, but it won't be an overnight transformation. Still, AppWare is well into its early stages of development.

At the AppWare Pavilion at NetWorld + Interop, Novell showcased AppWare-based products from 30 companies and provided an AppWare Solutions Guide listing 60 vendors. Many of these showcased products are aimed at vertical markets, including one AppWare-developed product for tracking software bugs with the unfortunate name of Bugger Base.

Novell's vision is intriguing. By bringing a wide array of ALMs under the AppWare umbrella and then allowing developers to create cross-platform network applications, Novell can fan the corporate application development flames.

But let's not get ahead of ourselves; it's still not complete. Only time will tell whether Novell has both the right strategy and the right vehicle to make it all happen.

♦♦ Gibbs is a writer, analyst and consultant based in Ventura, Calif. He can be contacted at (800) 622-1108, Ext. 504, or on the Internet at mgibbs@rain.org.

## Help desk

*Continued from page 2*

Jonathan Wheat, a security consultant at the National Computer Security Association (NCSA), a Carlisle, Pa.-based organization that promotes security awareness to microcomputer and network users, replies:

I know of a couple of antivirus products for Unix/SunOS platforms that you may want to check out.

One product is Cybersoft, Inc.'s, VFind, the first Unix antivirus scanning software. It scans Unix, MS-DOS, and Macintosh systems for viruses on network servers, clients and/or stand-alone systems.

VFind can scan tapes, floppy disks and removable media for viruses; it does not simply look for security holes where viruses may enter.

The scanner technology also does not require the virus to be active to be located. It can locate dormant viruses by using known scan keys and other methods.

VFind pricing ranges from \$395 to \$1,595, depending on the platform size and number of workstations. For more product information, call Cybersoft at (215) 825-4748.

Another product is Woodside Technologies, Inc.'s Fortress, a security tool kit program that includes a Unix antivirus protection module.

Fortress is designed to investigate security risks. Users can check hazard areas including Trojan horses, worms, viruses and weak passwords, from the main menu that the security tool kit offers.

Fortress is priced at \$495 for the workstation version and \$795 for the server version. For more product information, call Woodside Technologies at (408) 366-8300. □

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# Letters



## No sale

Your two unsubstantiated articles — "Digital's net unit on the block?" (May 30, page 1) and "Sale of Digital's net biz puzzles users" (June 6, page 15) have caused some confusion and disruption among Digital Equipment Corp.'s worldwide customer base and sales force.

Despite strong recommendations from independent analysts and our public relations professionals that this rumor had no basis in fact and should not be printed, you published these stories. To compound this, *Network World* failed to even inform Digital that the second story was being considered.

Digital's Network Products Business is considered to be a core competency of the corporation. Digital has been a pioneer in networking for nearly three decades. The business is healthy, growing and is developing leading-edge products through significant investments in research and development. We intend to continue these trends.

We hope that future articles concerning Digital in NW return to reflecting the strong relationships we thought we had built with your staff over the years.

Arthur Fiacco  
Director, Corporate Communications  
Digital  
Maynard, Mass.

*Editor's response: In developing the stories, NW received consistent information from multiple sources, some of whom requested anonymity, that Digital is considering selling its Network Products Business and divesting itself of several networking software product lines.*

NW was even informed by a Digital Network Products Business executive, who asked not to be named, that those reports, along with reports that "everything's on the table," were circulating within Digital.

Only one analyst — who said he has been hired by Digital to provide consulting services to the Network Products Business — suggested we not run the story.

There was never any "strong recommenda-

tion" from Digital's public relations department not to print the story, nor was there ever a denial that Digital was considering selling the group; only a "no comment" followed by the remark, "Everything's being looked at."

As is customary, we followed up on our story after it appeared to present additional views, including those voicing skepticism about the logic of the sale. NW even received a telephone call from a Network Products Business executive thanking us for the follow-up story.

Because Digital declined to comment on the original story, we did not call the company about the follow-up. We should have.

## Seeks opinion

You recently ran a profile of Richard Mandelbaum, director of the Center for Advanced Technology in Telecommunications (CATT) at New York's Polytechnic University (May 30, page 48).

The university where I work is setting up something similar called the Center for Advanced Information Technology.

We would like to get Mandelbaum's opinion on problems he encountered while setting up CATT. Could you pass on his electronic mail address? Thanks.

Subroto Mukerjee  
Program analyst  
Department of Engineering and  
Architectural Services  
University of Maryland  
College Park, Md.

*Editor's response: You can reach Mandelbaum via the Internet at rma2@prism.poly.edu.*

## The real problem

I disagree with the premise of your article "Remote LAN access still not all it should be" (May 30, page 25). Lack of funding and corporate management factors are not keeping us from providing access; lack of quality in the vendor's product is the major hurdle.

We've tried for two months to get Novell, Inc.'s Connect operational and now have only limited success. We've installed more than 10 patches and upgrades, and that from a product purchased as recently as March 1994.

Our biggest problem: The software can't handle line errors, so it drops users after a few hits.

Technical support from Novell is poor.

We've been trying our best and figured Novell's product would work the best because it would integrate well with our NetWare network. Boy, were we wrong.

Let's get vendors to give us better products out of the box with better documentation.

Raymond Tyc  
Lieutenant Colonel  
Air Force Logistics Management Agency  
Maxwell Air Force Base, Ala.

## Success stoppers

Regarding your review of Telular Corp.'s Phocell-4M product (May 30, page 44):

In fairness to Telular and to cellular operators everywhere, I'd like to point out that a number of factors can impact success in transmission of fax over cellular networks. My experience shows that a success rate of 50% on fax is quite low.

My guess is that other factors were impeding success, including: fax software, configuration, data rate and font settings.

Thanks for covering this innovative and important application of cellular service.

Lynne Gregg  
Product manager, personal services  
McCaw Cellular Communications, Inc.  
Kirkland, Wash.

## Bigger SONET

In the Letters section (May 30, page 49) James Carlini writes "...I am consulting on a major project that will have the largest private Synchronous Optical Network (SONET) in the country (more than 210 miles of fiber-optic right-of-way)...." Unless Illinois is no longer in the same country as California, he better check his facts.

The SONET network we have in California has more than 210 miles of cable just in the Los Angeles basin. That is several dozen systems (in both ring and linear configuration at OC-3 and OC-12 rates) that connect more than 50 sites (and more every week).

Carlini's statement must also not include the local exchange telephone companies and long-distance carriers since most of their networks (I suspect) would dwarf both of our networks combined.

Jim Walls  
Technical support specialist  
Southern California Edison Co.  
Alhambra, Calif.

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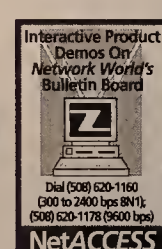
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# RODM objects plug up net management black hole

BY MICHAEL COONEY

IBM's Resource Object Data Manager (RODM) promises to change user perceptions that managing enterprise networks is akin to plugging a black hole in space.

The object-oriented database and a set of associated applications will let users integrate and centralize management functions by using objects to store and retrieve net status and control information.

Shipped with IBM's host-based NetView Version 2 Release 3 in 1993, RODM works with IBM's Graphic Monitor Facility (GMF) — a color graphics monitor — to give network operators a graphical view of their enterprise networks, including Systems Network Architecture and local-area network environments.

With RODM and GMF, operators view networks and attached devices as on-screen icons. When a device or link fails, an alert is sent to RODM, which then sends a command to the GMF to change the device's or link's on-screen icon to red. Clicking on the icon instructs RODM to forward status information about the device or link to the GMF workstation. The operator can then instruct RODM to invoke corrective commands that have been stored in an object (see graphic).

The RODM approach to net management is vastly different from what is in place today. Most enterprise net management today is done by a swarm of operators grouped around multiple terminals that display line after line of text messages. The operators have to correlate these messages and devise a corrective strategy when problems pop up. No wonder operators in this environment view net management as an exercise in black hole plugging. It's not very efficient in this age of reengineering and trimmed down, sleek work forces.

"RODM provides a base for centralized, end-to-end management of a distributed enterprise," says Karl Gottschalk, a senior programmer with IBM's network management design group. "Without RODM, users would end up with six or seven different products managing different areas of their network with no possibility of correlating the alerts and alarms from those areas as one distinct unit."

The objects in RODM can represent anything from computers and data links to LAN segments or whole work groups. Within each defined object is a method, which is a collection of information needed to control that object. For example, each object has a name, query method and rela-

tionship to other objects. Users can define objects to RODM manually or employ applications that automate the process.

Once defined in RODM, objects are displayed as icons and automatically updated on the GMF. If a failure occurs, the status monitor turns red. Operators can then click on the object to learn what the problem is.

Within the objects, users can customize individual functions. For example, if a modem fails and users want it automatically restarted, they can insert into objects the instructions needed to call a technician before restarting takes place. This gives the technician a chance to overrule the automated response.

"Through the use of objects, users can look at the current status of an object and the status of that object in the past. At the same time, users can look at the status of a lower, higher and peer level to determine what to fix first," Gottschalk says.

According to Jeff Crume, an advisory programmer in IBM's Networking Systems Technical Support Center, another unique aspect of RODM is that the objects are capable of updating their status without the aid of an operator.

"Conventional databases require an external application to change or manipulate data, whereas RODM programs can update themselves without requiring additional work," Crume says.

### DEFINING OBJECTS

Once objects are defined in RODM, users and developers can use them in multiple applications without having to rewrite or recompile the application. This feature should reduce development time and maintenance costs, Crume says.

While the objects within RODM are its heart and soul, defining them has been the single greatest drawback to implementing the technology on a wide scale.

"Loading the RODM database has been a bear for anyone implementing it," says Ellis Gregory, president of NetTech, Inc., a network management software developer and former NetView developer in Raleigh, N.C. "For a large user with 10,000 objects to define the task has been one they'd rather not undertake."

Crume acknowledges this problem but adds that help is already here and more assistance is on the way.

The first application that facilitates the automatic population of RODM became available earlier this year. NetView Multisystem Manager/MVS runs on top of Net-

View and automatically gathers topology and status data from any IBM LAN Network Manager or Novell, Inc. NetWare LAN and stores it in object form within RODM. NetView Multisystem Manager/MVS gathers this data by automatically polling agent software in LAN Network Managers. NetWare servers send data to RODM via Novell's NetView Agent soft-

tributed enterprise, so we needed tools to handle our SNA and LAN environments," says Anders Lindstrom, a systems programmer with Trygg-Hansa. "We are now spotting and solving problems more quickly."

While users are happy with the results so far, RODM and NetView Multisystem Manager/MVS are far from complete.

For example, IBM has announced but not shipped the Advanced Peer-to-Peer Networking Topology and Accounting Management (APPNTAM) application that works with RODM. APPNTAM automatically discovers all nodes and links in an APPN net and builds a topology map in RODM. When a problem such as a link failure occurs, APPNTAM can automatically attempt to correct it (NW, Jan. 10, page 6).

Crume says the next release of NetView Multisystem Manager/MVS will contain support for building Transmission Control Protocol/Internet Protocol objects in RODM, and the next release of NetView will do the same for SNA nets (NW, April 18, page 1).

ISSC is beta-testing the version of NetView Multisystem Manager/MVS that supports TCP/IP, and Debevec called it the single biggest requirement his firm has.

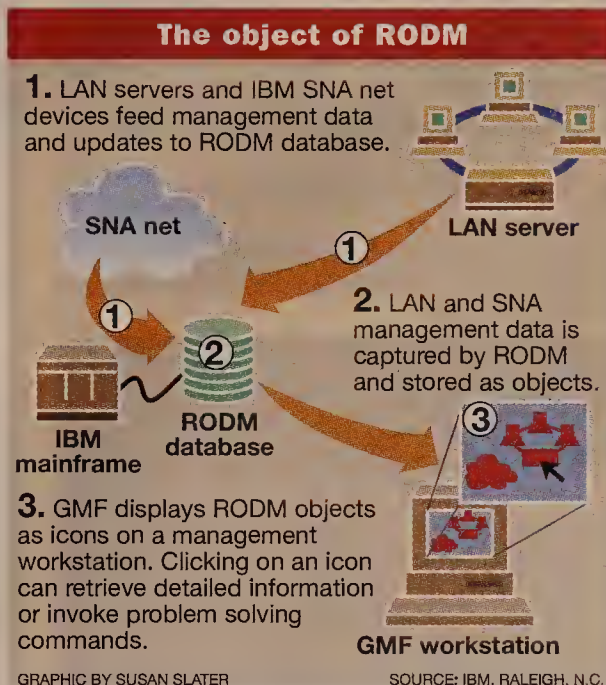
"It will give us a huge operational benefit because, for example, if a router goes down, we can graphically see all of the devices affected by its failure, not just the failure itself," Debevec says. "Plus, we'll be able to manage our SNA and TCP/IP nets from the same screen."

Crume also says applications that automatically find and build RODM objects for multiplexers and other non-SNA devices are forthcoming.

The next step after that is to utilize the objects in RODM with some of IBM's network automation products, such as Automated Operations Control or Automated Operations Network/MVS, which lets users automate responses to such network problems as link failures.

Getting some third-party vendors interested in building products that work with RODM would help, too, analysts say.

Whether object-oriented enterprise management becomes the wave of the future or just more fodder for the black hole remains to be seen. Other vendors, such as Hewlett-Packard Co. and Tivoli Systems, Inc., are also heavily invested in the technology.



ware. Status and topology are then displayed side by side with SNA management data on the GMF workstation.

Users so far have had success with RODM and NetView Multisystem Manager/MVS.

According to Alan Debevec, an advisory programmer with Integrated Systems Solutions Corp. (ISSC), RODM and NetView Multisystem Manager/MVS have helped the IBM-owned system integration and outsourcing firm cut its management staff from about 50 operators to eight (NW, May 30, page 7).

Debevec says RODM and NetView Multisystem Manager/MVS handle topology changes on the fly and make operators aware of those changes immediately. In the past, changes had to be manually coded, which would often take days or weeks to accomplish. Also, operators don't have to know the ins and outs of each device or LAN because the objects defined in RODM tell them how to address problems.

Workers at Trygg-Hansa, a large insurance firm in Stockholm, Sweden, are using RODM and NetView Multisystem Manager/MVS to regain centralized control over a previously distributed network.

"We felt we had lost control of our dis-

Cooney is a Network World senior editor.



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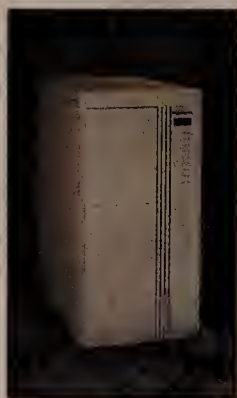
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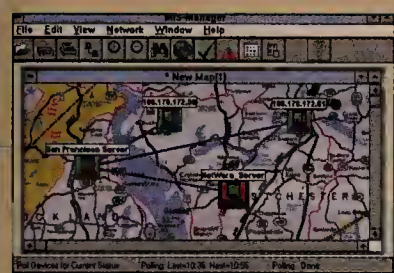


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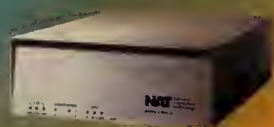
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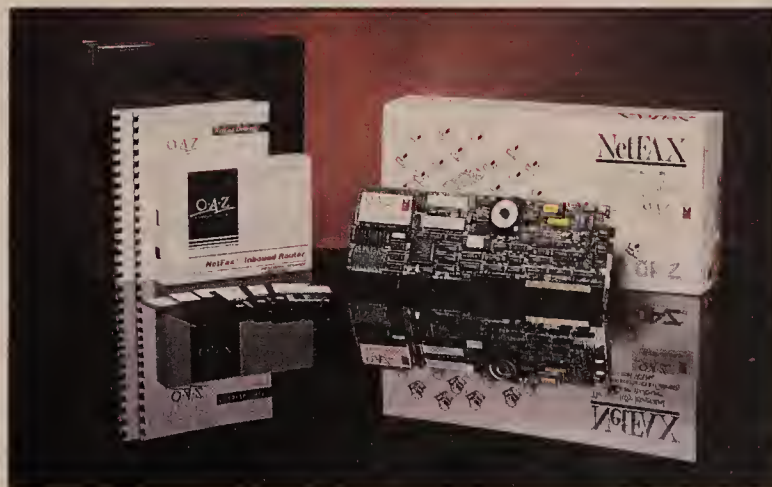
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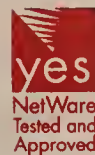


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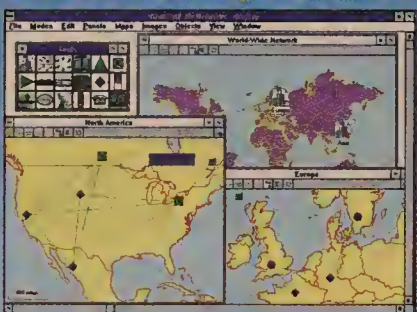
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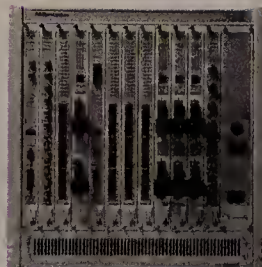
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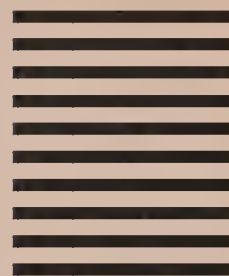
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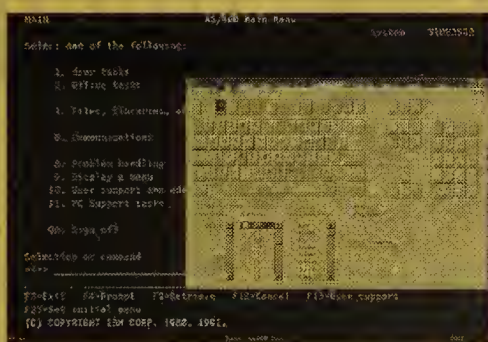
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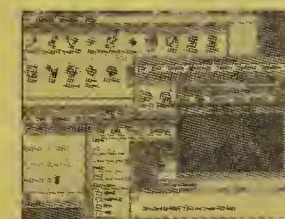
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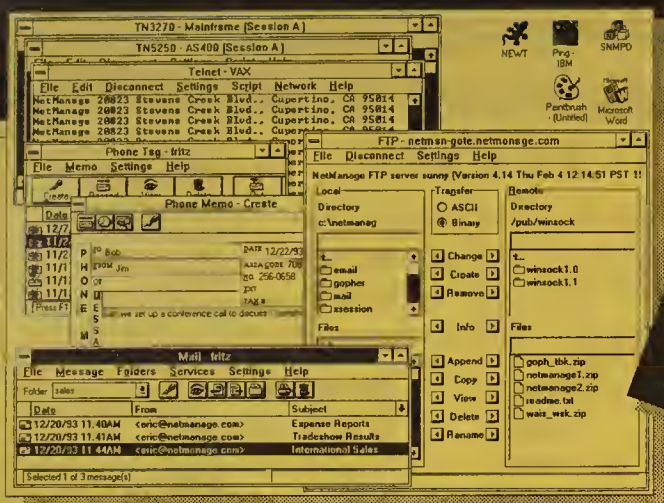
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**More Windows applications than any other  
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- Windows Sockets API
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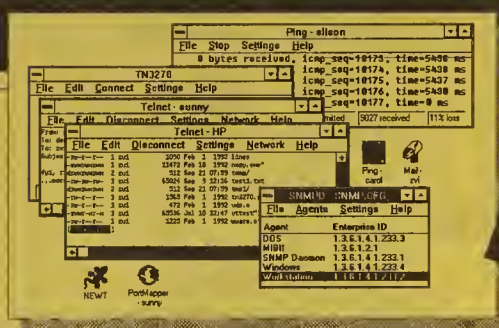
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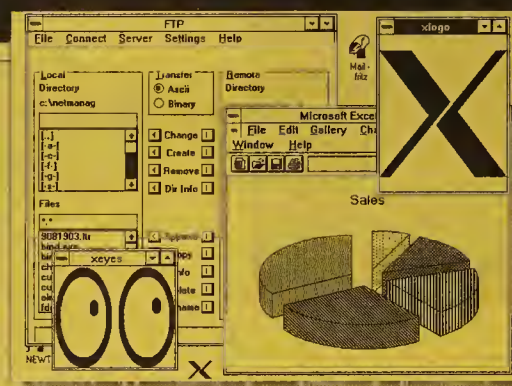
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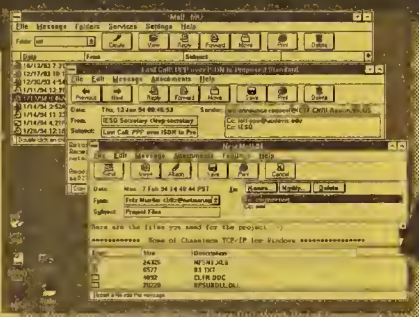
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- Address book with groups (mailing lists)
- Multiple message viewing
- Point-and-click operation
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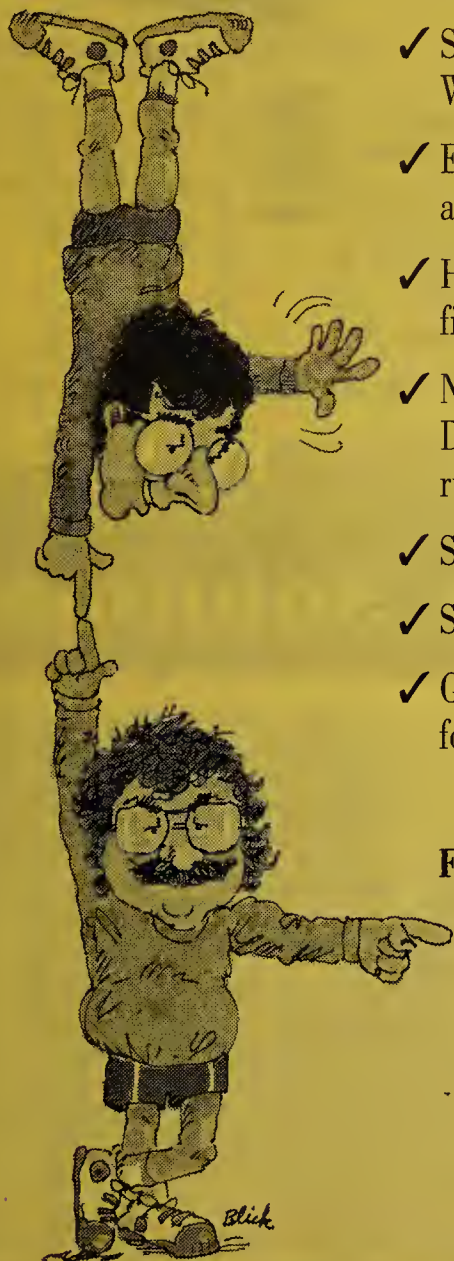
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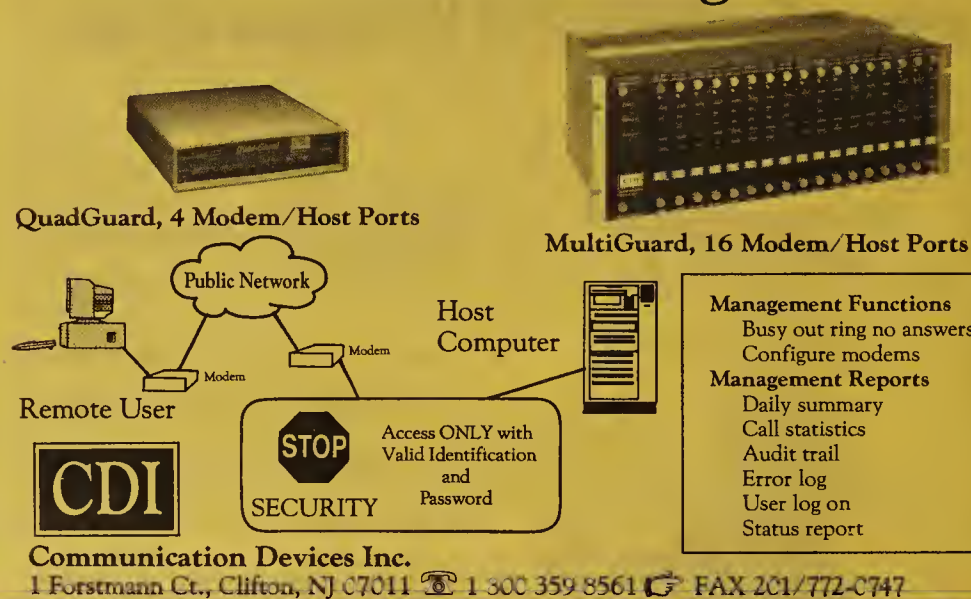
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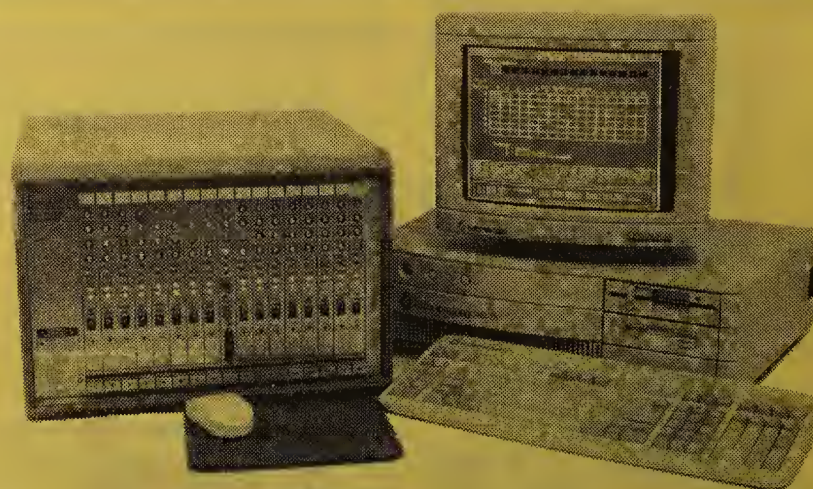


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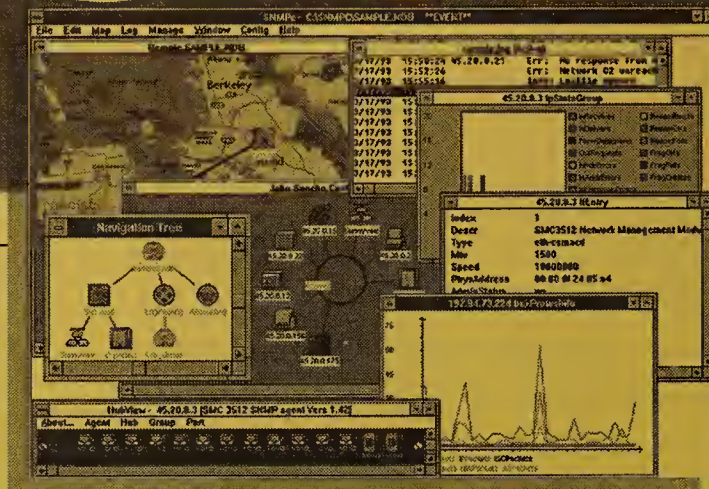
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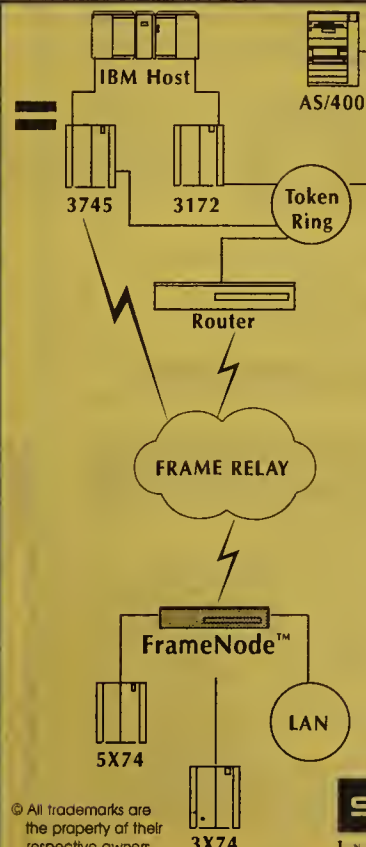
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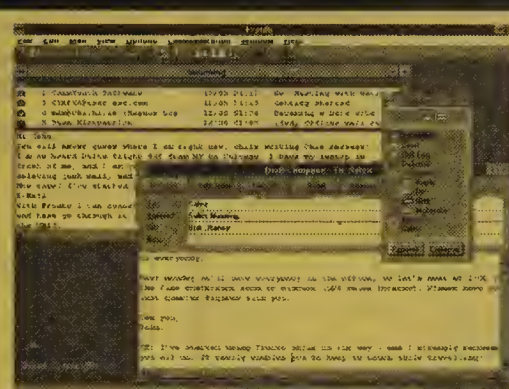
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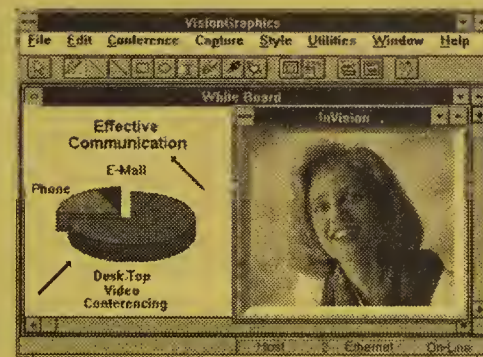
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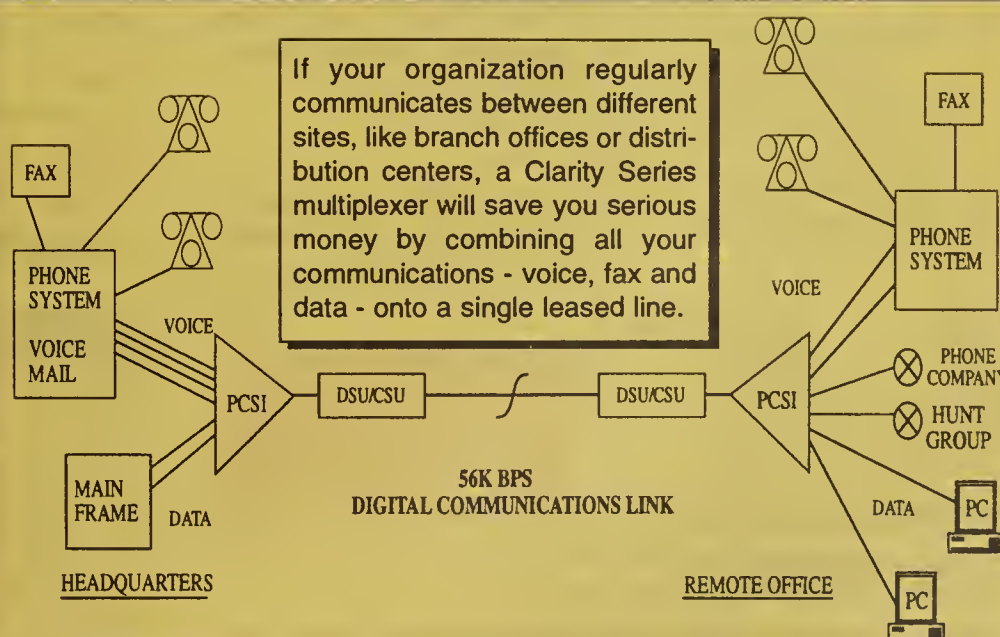
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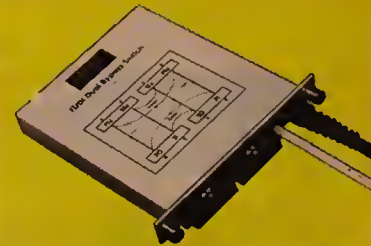
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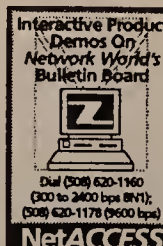
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## Party

Continued from page 1

faces for voice and video.

To provide access to mainframe resources for ATM local nets, IBM will announce new software and an ATM adapter for its 3172 LAN-to-mainframe gateway.

Dubbed LANLink, this software will support an ATM link from the 3172 to the 8260 hub, providing a route to the host for ATM LANs. The same 3172 can be used simultaneously to support a mix of IBM Token-Ring, Ethernet and Fiber Distributed Data Interface LANs. LANLink will ship this year, Anderson said.

The Turboways ATM Concentrator will support from eight to 12 ports. It will be priced between \$3,995 and \$5,994 and will ship in June.

IBM is also expected to announce a \$395 price tag for its previously announced 25M bit/sec ATM adapters, when purchased in units of five.

Anderson said IBM will be aiming at competitors, including Ascom Timeplex, Inc., Newbridge Networks, Inc., Northern Telecom, Inc. and StrataCom, Inc. Of those, only Newbridge has ATM products ranging from adapters to high-end switches.

What sets IBM apart is its Broadband Network Services (BNS) ATM switch software, which lets users

allocate bandwidth on demand, control congestion, determine net status and select optimum net routes.

"The Blue tinge of BNS will provide customers with the dynamic bandwidth allocation ability and performance they lacked with T-1 muxes and with the class-of-service features they will find difficult to [match] with pure-ATM switches," Anderson said.

Others were less optimistic. "We class IBM as networking neophytes and don't think it'll be able to pull this whole ATM strategy together," Graham Morrison, project leader for net design with Blue Cross/Blue Shield of Connecticut, who has been briefed about IBM's ATM plan. "IBM cannot drive networking standards any more like it did once with Token Ring."

Morrison said IBM is starting its ATM rollout in an ominous fashion by coming out with a nonstandard 25M bit/sec ATM adapter. The ATM Forum earlier this year dropped the proposed IBM-sponsored 25M bit/sec standard in favor of a 51M bit/sec speed.

The largest firms in the world are developing ATM products and services, and IBM is just one of them, said Todd Dagres, vice president of equity research at The Robinson-Humphrey Company, Inc. in Atlanta.

"They have an advantage over those coming at this with a TCP/IP slant, such as Fore Systems, but there are too many variables, like chipset design and switch architectures, that IBM can't control," he said. ☐

## Shows

Continued from page 7

■ Trinzic Corp., of Palo Alto, Calif., will demonstrate enhancements to its Forest & Trees tool for accessing Notes databases.

Version 3.1a will give users access to Notes views, essentially indexes to Notes databases, which Trinzic said will mean much faster information flows.

The Windows software is available immediately with prices starting at \$695 per copy.

Trinzic: (800) 775-7122.

■ NetSoft, of Laguna Hills, Calif., will unveil an enhanced version of its NS/3270 Windows 3270 emulation software that adds native Transmission Control Protocol/Internet Protocol connections via Novell NetWare networks. Pricing starts at \$95.

NetSoft: (714) 768-4013.

■ Corporate Image Software of Boston will announce an enhanced version of

its Chart Object for Notes that will give users a royalty-free viewer for opening and manipulating charts based on Notes databases.

Shipping is scheduled for July, with pricing starting at \$1,495 for a five-user license.

Corporate Image: (617) 876-0514.

■ Illustra Information Technologies, Inc., formerly known as Montage Software, Inc., of Oakland, Calif., will demonstrate a new visualization tool for its object-oriented database management system.

Illustra: (510) 652-8000.

■ Kenan Technologies of Cambridge, Mass., will announce an enhanced version of its Acumate ES multidimensional database and on-line analytical processing software. Acumate ES, Version 1.1, scheduled to ship in August, will add support for server-to-server connectivity via remote procedure calls.

Pricing will start at \$25,000 for a five-user license.

Kenan: (617) 225-2224.



# Reviews

Continued from page 1

implementing Exchange — previously known as Electronic Messaging Server — a top priority. But now they fear that those plans may be foiled by delays in bringing a production version of the product to market.

"They've been intentionally vague about when they're going to ship it," said Erik Iversen, director of application development services for Nabisco Foods Group in Parsippany, N.J. He is responsible for a 4,500-user, 27-post office E-mail net.

There are factions in Nabisco that want to install Lotus' Notes groupware product, but upper management is holding out until Exchange becomes available, believing the work flow and groupware features Microsoft is promising will be equal to Notes, with a more stable and open architecture.

"Depending on the timing [of Exchange's general release], it will blow Notes out of the water. But we need a firm date so we can make our plans," Iversen said.

As recently as a week before the conference, Microsoft executives were promising to release Exchange by the end of 1994 or the first quarter of 1995.

Now they are calling the release a pilota-

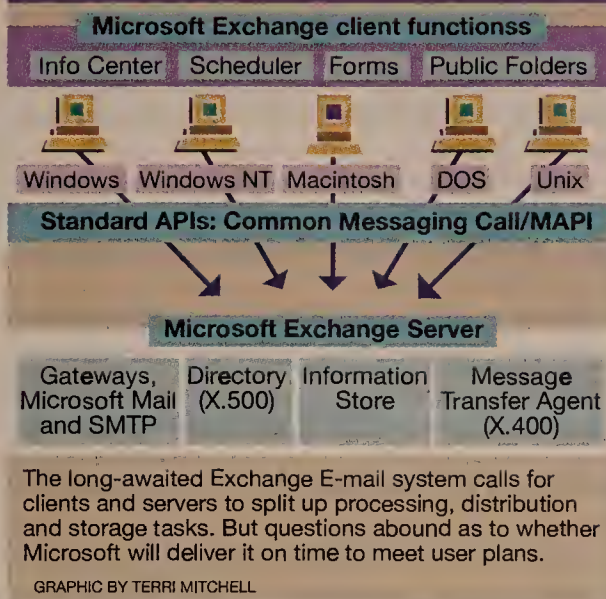
ble beta, and referring to it as Test Release 3 (TR3). The original seven-user beta test, TR0, occurred last year; TR1 added 60 more users, concluding last month. TR2 began last week, with 100 more users.

"In previous product release cycles, we would probably have called [TR3] a first release," said Todd Warren, group product manager in charge of Microsoft's business systems division marketing.

The extra round of beta will help Microsoft stabilize and debug Exchange, said Warren, who said Microsoft had learned its lesson after the beating it took from users and the press after the first Windows NT release. Users take longer to evaluate and adopt complex server software than they do desktop products, he said. Users are so eager to try Exchange that they are standing in line to participate in TR2. They wait futilely, however — the TR2 list is closed.

Administration and security features account for much of their excitement. Most of the security but Exchange does add E-mail administration features of its own, including user adds and drops, and the ability to limit the size of messages and storage available to users. According to users, Exchange has performance and connection monitoring capabilities that let them track how efficiently their E-mail systems are running, check the status of intersite connections via routers and bridges,

## Microsoft looks to get Exchange out of the gate



and monitor servers, as well.

These features are nice, but it would be a major improvement if Exchange supported the Simple Network Management Protocol so users could link E-mail management with their existing management systems, said Rick Fell, net analyst at Chevron Industries, Inc. in San Ramon, Calif.

Exchange relies on Windows NT's SNMP support to send error messages, but Microsoft is considering whether to add full SNMP support to Exchange if it can complete the work before release, said Thom McCann, program manager for Microsoft Exchange Server. ☐

## What's in a name?

Exchange has been known as Touchdown, Electronic Messaging Server, EMS and EMS Server. Following the announcement, Microsoft staffers could not agree whether the formal name was Microsoft Exchange, Exchange or MEX. Most users and independent software vendors call it EMS.

## Exchange offers E-mail, groupware

Microsoft Corp.'s electronic mail and groupware system Microsoft Server Exchange operates on Windows NT servers and clients running the yet-to-be-released Daytona version of Windows NT.

The client piece is built into Daytona, which should be available this summer. It includes a "universal in-box" called the Info Center, which can receive messages from facsimile machines, modems, through the Internet and from competing E-mail systems that support Microsoft's Messaging Application Programming Interface (MAPI).

The client has an updated version of Microsoft's Schedule+ group scheduler and a text editor to create and format messages. It has the ability to attach objects using OLE 2.0, a rules feature that will search and reroute, save or discard incoming messages, and a feature that lets users search the Exchange database to find other users or documents in shared-work folders.

From the client, users can create and manipulate Public Folders, which let them store and share information in much the same fashion as Lotus Development Corp.'s Notes databases. The Public Folders themselves are stored on the server.

The server includes Exchange, the basic E-mail system that supports message

transfer via X.400, Simple Mail Transfer Protocol, MAPI and a proprietary protocol that Exchange uses to talk to its database.

It also supports the Open Software Foundation, Inc.'s remote procedure call, Transmission Control Protocol/Internet Protocol and X.25 networking protocols, and the X.400 Application Program Interface Association Common Messaging Call API.

The Information Store database engine is new but based on Microsoft's Jet, which is also the basis for Microsoft's Access database.

It is object-enabled and is tuned for the fast I/O and information retrieval needed for E-mail, rather than the analytical power of a database used for an accounting system, for example, said Bill Sornsin, project manager for Microsoft's business systems division.

It contains all X.500 directory information, Public Folders, Schedule+ requests, messages and attachments.

The server also replicates Public Folders and the X.500 directory among the servers in the network.

Administrators can decide how often and to what servers Public Folders are replicated, but directories are automatically replicated to all the connected servers.

BY KEVIN FOGARTY

# Interoperability

Continued from page 10

months before the ITCA show analyzing how their networks interconnect — or don't interconnect.

At the show, AT&T and Sprint demonstrated calls over virtual networks and switched services, showing why some calls cannot be completed by direct dialing.

For instance, an AT&T customer with T-1 access can dial a user directly with switched access from the local exchange carrier (LEC) into Sprint's Clarity service.

"But it won't work in the opposite direction. When a customer has T-1 access, we bypass the LEC," said Jim Posko, AT&T videoconferencing product manager, at last week's ITCA demo.

"The Sprint Clarity customer would have to dial the access code 10288 to get into the AT&T network," he said.

If both users have switched access or BRI access but their long-distance carrier doesn't have data links in the originating and terminating central offices, the call simply cannot be completed.

The only way these two users could set up a videoconferencing session would be to reserve time with a so-called gateway service that would provide a bridge between their networks.

MCI and Sprint already offer gateway services, and AT&T last week announced that its gateway service, called the Video Center, will be available this fall (see story, page 31). The carriers demonstrated their gateways at the ITCA show.

## INTEROPERABILITY ISSUE

There are also still problems related to the lack of interoperability in ISDN services from the Bell operating companies, too, which are trying to upgrade to the National ISDN 1 standards.

"We're still having some problems related to upgrading all the telephone companies to National ISDN, but it's coming along," Posko said.

"Interoperability is becoming a bigger issue because videoconferencing is moving into the inter-company world," he noted.

The Federal Communications Commission long ago mandated equal access for voice services but not data. The unfortunate result is that users cannot assume data calls will go through and therefore, carriers advise users to test each videoconferencing call in advance to make sure it can be completed.

Although MCI was not at the ITCA demonstration, the carrier is contributing to a report describing interoperability glitches and ways to overcome them. The report, dubbed "Carrier Video Interconnection," is expected to be released by Washington, D.C.-based ITCA next month.

Whether some calls can be completed at all — such as an AT&T 384 switched dial-up to MCI's Virtual Network or Vision services — is still under investigation, according to the draft of the ITCA report.

## NO UNIVERSAL NETWORK

"There is no universal network in place," said Jean Wilson, corporate telecommunications director at SunHealth Alliance, which provides support services to 280 hospitals across the South and Southwest.

SunHealth oversaw the installation of videoconferencing equipment at 29 sites across 15 states during the past three years.

"We were one of the first to interoperate across carriers," Wilson noted.

Equipment interoperability is also a concern to SunHealth Alliance, which three years ago chose Compression Labs, Inc.'s proprietary Rembrandt II video system for use at the hospitals.

"Our equipment is already obsolete because it doesn't have the H.320 interoperability standard," Wilson said.

Copies of the ITCA's report can be obtained by calling (703) 506-3280. ☐

## PRODUCT EXCHANGE ADD-ONS ROUNDUP

Microsoft Corp. is relying on independent software vendors to supply many of the high-end groupware, imaging, work flow and other functions of its Microsoft Exchange Server.

The following vendors were among those that announced support for Exchange last week.

■ **Corporate Software, Inc.'s subsidiary CSI Technologies of Arlington, Va.** — Will enhance its Mail Express gateway to support a link between Lotus Development Corp.'s Notes and Exchange.

CSI: (703) 522-1310.

■ **Verity, Inc. of Mountain View, Calif.** — Announced that its Topic Developer Kit will support Exchange, allowing users to build data agents that can do extensive text searches and retrievals across an Exchange net.

Verity: (415) 960-7600.

■ **Baranof Software, Inc. of Brighton, Mass.** — Announced that its multi-vendor E-mail management software would support Exchange, providing end-to-end monitoring of E-mail post offices and gateways on a single console.

Baranof: (800) 462-4565.

■ **Datamedia Corp. of Nashua, N.H.** — Announced its intention to port its SecureExchange encryption and digital signature application to Exchange.

Datamedia: (603) 886-1570.

■ **Isocor of Los Angeles** — Announced that its Electronic Data Interchange engine would support Exchange, letting users convert electronic data interchange messages in the ANSI X12 and EDIFACT formats to X.435 format for distribution by Exchange.

Isocor: (310) 476-2671.



# Lower rates

Continued from page 4

contract option.

## THE BEST RATES

Shopping for carriers is all the easier by a Supreme Court decision earlier this month reaffirming an earlier appeals court ruling that requires all long-distance carriers to file tariffs. This helps users gather information to use in negotiations, according to Levine.

A potentially more important case remains unre-

# Bell Atlantic

Continued from page 1

not entirely, with money from a Pacific Bell-supported trust fund and have suffered problems forging links to one another (NW, May 9, page 30).

By contrast, Bell Atlantic stands a good shot at getting satisfied, paying ATM customers, analysts said.

"The Defense Department has expressed extreme interest in ATM," said Warren Suss, president of Warren H. Suss Associates, a consultant to federal contractors in the communications field.

"They have so many varied systems that they can achieve significant cost savings by carrying different kinds of traffic across the same backbone," Suss said. "ATM represents a single solution to an extraordinarily complex set of problems."

Although the tariff will make the service available to the entire government, Bell Atlantic is positioning ATM as the high-end offering under its Telecommunications Modernization Project Defense Department contract, said Tony D'Agata, the carrier's vice president for federal military systems.

D'Agata would not reveal the prices in the upcoming ATM tariff, but said there would be no usage or mileage charges. Pacific Bell's stated prices also are volume- and distance-insensitive, with a flat rate of \$4,850 per month for 45M bit/sec access and \$7,899 per month for 155M bit/sec access, plus installation charges.

Thomas Nolle, president of CIMI Corp. in Voorhees, N.J., said Bell Atlantic's pricing position would

solved in a federal appeals court.

The case involves the Federal Communications Commission's current policy that allows carriers other than AT&T to file minimum and maximum, rather than exact, rates — although MCI, Sprint and several others generally file their full rates, except for their special deals.

"AT&T is hoping that the commission — out of a desire not to burden smaller carriers — will loosen the filing requirements for everybody," Levine explained.

However, the common view is that tariff requirements will remain in place or tighten, according to Levine. ☐

carry weight with the industry because of its customer base.

"[The Defense Department] and the federal government probably consume half of the ATM premises equipment out there," Nolle said.

Both Suss and Nolle cautioned that carriers need to overcome buffering and flow-control problems in ATM carrier switches in order for Bell Atlantic or any other carrier to win more than a handful of ATM customers.

**"The Defense Department has expressed extreme interest in ATM. They have so many varied systems that they can achieve significant cost savings by carrying different kinds of traffic across the backbone."**

Although he would not cite specific Defense Department agencies, Bell Atlantic's D'Agata said several are awaiting the filing and considering the service.

Activity within the government also has been a major barometer for Sprint Corp., which announced ATM service last year.

"A tariff filing is an indication that [Bell Atlantic] is very serious about it," said Bernie Schneider, Sprint's di-

rector of product management.

Both government users and private sector Defense Department contractors are showing a lot of interest in ATM, Schneider said.

Bell Atlantic is further along in discussing government ATM applications than in the private sector, D'Agata said, but the tariff filing will point to a direction there, as well.

"It may end up being one and the same with the commercial tariff when it's filed," he said.

Not all government users — even those already using Bell Atlantic's cell relay-based Switched Multi-megabit Data Service (SMDS) — are ready to take up the offer.

"Frankly, I'd rather see them offer the 56K [bit/sec] SMDS," said Tom Maufer, senior systems engineer with the Goddard Flight Center of the National Aeronautics and Space Administration.

Nevertheless, Bell Atlantic's D'Agata said "there is a community of interest" at NASA to pursue ATM service. ☐

takes it over to the Novell server, or vice versa," Fitzgerald added.

NTI has been criticized for being late out of the box in supporting NetWare Telephony Services. By contrast, AT&T — which helped develop the product — has been marketing it for several months under the trade name PassageWay (NW, March 28, page 31).

Connor likened it to the criticism about the company being late developing products supporting Asynchronous Transfer Mode. But he added, "The market for CTI is just starting." ☐

Senior Writer Bill Burch contributed to this story.

# Doctors

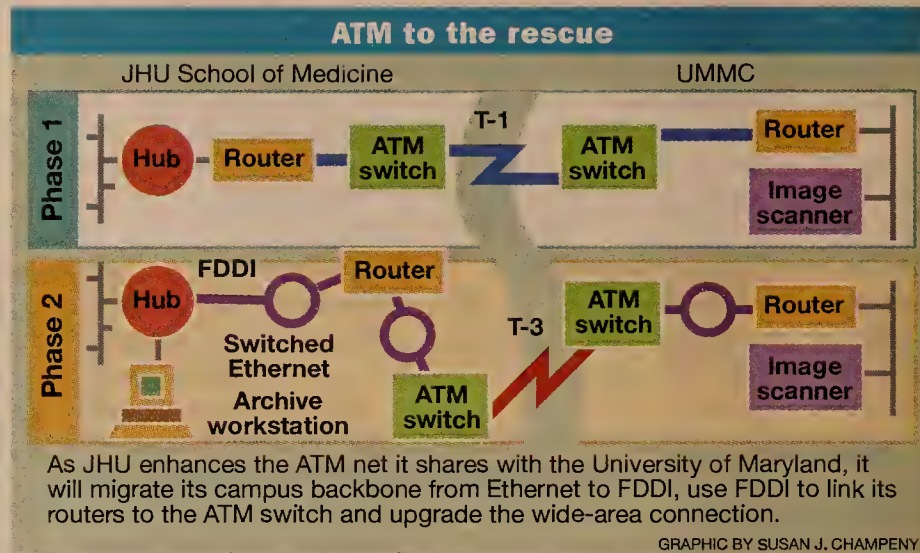
Continued from page 1

performed to reconstruct the skulls of children with abnormalities," said Carey Kriz, codirector of the center. "We're moving a minimum of 24G bytes of image data on a daily basis and need a network infrastructure that can provide a high level of performance and bandwidth. ATM appears to be the best answer."

technologies at JHU. "We might also run some FDDI to the desktop for certain workgroups."

Users need to be cognizant of exactly what is connected to the network, he added, noting that most of the medical scanners and other equipment JHU employs have integrated Ethernet interfaces, which made a move to switched Ethernet all the more reasonable.

The final stages of the migration to ATM over the next three to five years will extend the scope of the ongoing



In the ATM trial network that is up and running, a UMMC scanner digitizes CAT scan and MRI images and ships them across an Ethernet local network. A Cisco Systems, Inc. AGS+ router attached to the LAN passes the images across a T-1 line to UMMC's 2010 switch, which forwards them across another T-1 to a 2010 switch on JHU's campus.

The images are then routed to a database at JHU's Center for Information-Enhanced Medicine where medical researchers on Silicon Graphics, Inc. workstations can access and analyze them. Before it goes into production mode, the two facilities will upgrade the Ethernet to Fiber Distributed Data Interface and the wide-area network link from T-1 to T-3 (see graphic).

In order to prepare its network for ATM, JHU began a net overhaul about a year ago with the installation of an FDDI backbone, which replaced its Ethernet predecessor.

In the next stage, which is slated to begin later this year, JHU will convert certain segments of its 10Base-T network to switched Ethernet by upgrading its UB Networks, Inc. Access/One hubs with the company's Dragon-Switch modules. That will enable JHU to deliver dedicated 10M bit/sec links to archive workstations.

"The move to switched Ethernet is an incremental leap in technology that allows us to get higher bandwidth and migrate to the ultimate switched technology — ATM," said John Doyle, director of systems and

trial network by introducing ATM on the campus backbone and eventually down to the desktop, especially in areas where manipulation of radiological images is key.

"This will allow doctors and patients, for example, to discuss ultrasound and CAT scan results in an office environment while actually reviewing the images," Doyle said. "One surgeon

performing an operation could consult with a colleague halfway around the world during an actual procedure."

Undertaking a migration from a shared Ethernet environment to ATM is likely to raise some concerns about upgrade costs. "Achieving the proper price/performance ratio is always the most difficult part of a new technology shift," Doyle said. "Each company has to figure out early in the process just how much expense it can

afford to swallow."

Picking a standardized technology was also a key issue for JHU.

"People from health care systems across the nation will want access to our image database and other areas of expertise, so we need to adhere to standards," Kriz said. "Standardization is key if we want to be good neighbors." ☐

## Keys to the move

**In migrating to ATM, JHU recommends:**

- ▶ Upgrading to a high-speed fiber-based backbone.
- ▶ Running fiber to critical desktop machines.
- ▶ Adhering to standards to ease integration with other networks.
- ▶ Installing small, trial ATM nets to get comfortable with the technology and evaluate its performance.

# Telephony

Continued from page 4

Link as a needed step.

A Microsoft official characterized TMAP as simply a move to clear up confusion over the role of each vendors' CTI product.

"If you have a Windows desktop, you can use those [TAPI] applications, and if you want to use the Novell server on the back end, that's fine," said Charles Fitzgerald, a Microsoft product manager.

"It takes a request from a TAPI application and

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# Boole expands Command/Post

BY JIM DUFFY

San Jose, Calif.

Users looking to add their Unisys Corp. systems and desktop applications to the mix of centrally managed network elements can look forward to some help from Boole & Babbage, Inc.

Boole, based here, will soon allow users of its Command/Post to manage their Unisys mainframes and personal computer applications, as well as automate responses to common problems. Command/Post is a Unix-based management system that filters, prioritizes and correlates alerts from element managers and, through terminal emulation, issues commands to those managers to resolve problems.

Under an agreement with JBM Electronics of St. Louis, Boole will market protocol converters that provide console connectivity, emulation and management automation functions for Unisys 1100 and 2200 processors. The protocol converters provide Command/Post consoles with physical connectivity to the Unisys mainframes and software connectivity via emulation of Unisys UTS 60 terminals.

"This allows us to collect console messages and application messages from Unisys, and convert that into ASCII," said Jack Brown, director of marketing for distributed systems management at Boole. "It allows us to use our application program interface to get commands back into the Unisys machine."

Under a separate agreement, Boole will resell Shany, Inc.'s AlertView application management software and work with the firm to integrate it with Command/Post. When the integration work is complete, Command/Post will be able to receive alerts from, and issue commands to, AlertView, Brown said.

AlertView monitors PC local-area network applications, providing alerts, automated responses and automated problem prevention for DOS, Windows and OS/2 workstations connected to NetWare, LAN Manager and LAN Server nets.

Command/Post users said AlertView integration will help them get a better grasp of their LANs.

"Something we weren't able to do with Command/Post before was get out to the PC LANs," said Clinton Strait, command center manager at the Long Island Lighting Company in Hicksville, N.Y. "Everything had to be through an RS-232 port, and all the big systems

could do that. This opens up access into LAN Manager that we didn't have before."

The Unisys protocol converters are available now from Boole. Shany's AlertView will be available from Boole in about 30 days, Brown said.

©Boole: (408) 526-3000.

**"Something we weren't able to do with Command/Post before was get out to the PC LANs."**

## ISDN Forum

Continued from page 8

cations for its ProShare desktop videoconferencing system. If the group embraces such standards, it will run afoul of intellectual property laws, he warned.

Also opposing de facto standards was Sigram Schindler with Teles GMBH in Berlin, a delegate from Europe's ISDN community. Standards such as Intel's will become common, but they will not address broader application development issues, he said. One of the reasons why German ISDN applications have developed so quickly is that the industry agreed on application program interfaces (API) on both line- and application-side interfaces, Schindler added.

"We need these systems internal interfaces in order to advance more rapidly," he said. "As long as there's no common platform...nobody does the investment." Long term, de facto standards for ISDN won't survive, Schindler predicted.

On the other side, group Chairman Samar Basu, a member of the technical staff at AT&T Bell Laboratories, warned that group members cannot afford to be purists. "We can't be divorced from the market-

place," Basu said.

The group should work to develop standards that allow such applications as Intel's ProShare to work end-to-end, Basu said. Also, the group could work with Intel to extend its APIs, suggested Kevin Dunetz, a communications design engineer with applications developer CICAT, Inc. in Fairfax, Va.

The stakes in the debate are high. By coming out with inexpensive desktop videoconferencing, Intel hopes to establish early dominance in the multimedia market, then build on that position with additional product offerings, according to Sanjay Mewada, an analyst with The Yankee Group in Boston.

While this may speed to market "standard" desktop conferencing tools, it could constrain development of other multimedia products by resulting in narrowly defined standards tailored to specific applications.

To close the meeting, Basu asked the group's individual members to complete multimedia ISDN application profiles for the group's October meeting.

Whether those profiles will ever bear fruit is debatable. With focus on developing National ISDN standards, the forum has yet to put out a single stable profile signed off by every technical working group. ☐

## RAM Mobile

Continued from page 8

Chuck Ching, director of information systems at VF Factory Outlets in Reading, Pa., a subsidiary of VF Corp. that sells merchandise from Jantzen, Inc., Wrangler, Inc., Vanity Fair Mills, Inc. and other clothing subsidiaries, said, "If we have a warehouse sale with portable register capabilities, this could help us speed up customer lines." He added that about 40% of his customers use credit cards, "and we could handle them all on that equipment," rather than rewiring and borrowing equipment from the fixed sales floor, which would slow operations.

Marshalek said verification time is 8 to 10 seconds, compared with about 30 seconds on average over wired links because there is no connection setup time with wireless communications. The battery life of the

modem is about 100 transactions or one day.

It has yet to be determined, though, how many merchants want to be mobile. While Hardees Food Systems, Inc. in Rocky Mount, N.C., has a portable unit, it does not peddle fast food in a mobile capacity often enough to merit wireless communications, said Price Craddock, telecommunications analyst.

Robert Rosenberg, president of consultancy Insight Research Corp. in Livingston, N.J., said, "I think the biggest application would be to move salespeople from behind the checkout desk onto the floor."

For this purpose, the M6000 comes with a shoulder strap or belt attachment and works with any point-of-sale terminal with an RJ-11 connection on the back.

Credit card processing company Transnet Corp. is reselling the package today, and MasterCard Automated Point of Sale Program is in the process of certifying it.

©RAM Mobile: (908) 602-5642.

## Trojan horse

Continued from page 1

"There was no indication from anybody that they were really doing anything unusual," he said. "This is where OLE is really insidious."

With OLE, a user has no way of knowing whether an application or file — either of which can be several megabytes in size — is stored locally and may not realize the implications of dragging it across the network, according to Nolle.

"What people don't realize when they're editing these OLE objects is that they're actually starting up the application," said Michael Goulde, an analyst at the Patricia Seybold Group, Inc. in Boston. "This isn't some little spreadsheet editor that pops up; it's Excel. And if you're loading Excel from the network, that takes a lot of bandwidth."

### CONFINE IT TO DESKTOPS

When users launch a server-based application, the operative part of the application code is downloaded to the client's random-access memory. The application also has to download code for special features — such as graphing in Microsoft Excel — as they are invoked by the user, said Dave Seres, senior product manager for Microsoft's OLE marketing team.

Some users are aware of the problem. Lawrence Harris, technical manager for market data vendor Quick America Corp. in New York, refuses to use OLE across a network "because it would be way too slow. I recommend to people that they don't do too much in OLE, even on the desktop. It takes up too much memory."

"OLE is a desktop thing," agreed Morgan Brown, product manager for Visio, an imaging application from Shapeware Corp. in Seattle. "OLE is not elegant in a network environment right now. It is really something that excels and shows its use in integrating Windows applications on a single desktop."

Nolle said a short-term solution involves discipline. MIS has to devise a set of rules about what users can store on servers and then enforce those policies, even to the point of dismissing employees who repeatedly disobey them.

He said that at many companies, employees have taken to using file servers for storing large files that they should really be keeping on their own hard drives.

Over the long run, he said, vendors should create object extensions that

show how large a file is and where it is located, then essentially ask the user whether to open it.

Microsoft says much of this problem could disappear with Cairo, an advanced version of Windows, due in late 1995. Cairo will support distributed OLE, which will let users run applications remotely on servers rather than downloading them to their desktops.

According to Seres, Cairo will feature a variety of management tools that will make it easier for MIS to manage what is stored on a network, for example, by using security access lists to determine who can access which files on a server.

But John Rymer, vice president at Seybold and a colleague of Goulde, said that might simply shift performance problems from the network to the application servers.

Joseph Correia, vice president for applied technologies at Travelers, Inc. in Hartford, Conn., said that after looking at OLE, he will likely settle on IBM's Distributed System Object Model for future object-oriented applications because it has better facilities for managing communications between objects on a network.

OLE "really gets to be a system programmer's nightmare in terms of connecting [the objects]," he said.

### Comments?

See "Contacts" box on page 2.

## NETWORK WORLD

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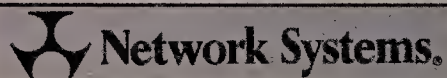
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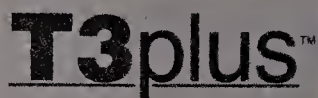
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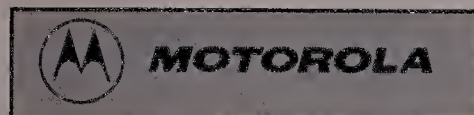
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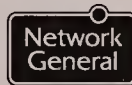
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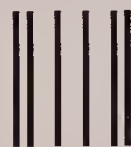
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SynOptics Communications is a leading supplier of networking products and management systems to organizations worldwide. SynOptics delivers the network fabric that enables organizations to build enterprise-wide network systems today and multi-enterprise networks in the future. The network fabric is built with intelligent hubs that link all types of computers, integrate bridges, routers and switches as needed, and provide common, integrated network management. The result is an underlying, flexible structure that provides high-speed network communications. The company, founded in 1985, is headquartered in Santa Clara, CA and has more than 50 offices worldwide. SynOptics is publicly traded over the counter under the NASDAQ symbol SNPX.



**Ungermann-Bass**  
Ungermann-Bass is a supplier of networking hardware and software products and provides a range of integration services including consulting, training, and technical advice to build and support networks worldwide. NetDirector, for OS/2, NetDirector for UNIX, and NetAssistant™ management products provide the basis for management solutions scalable from campus to enterprise environments.



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# Faster Ethernet without taking a number.

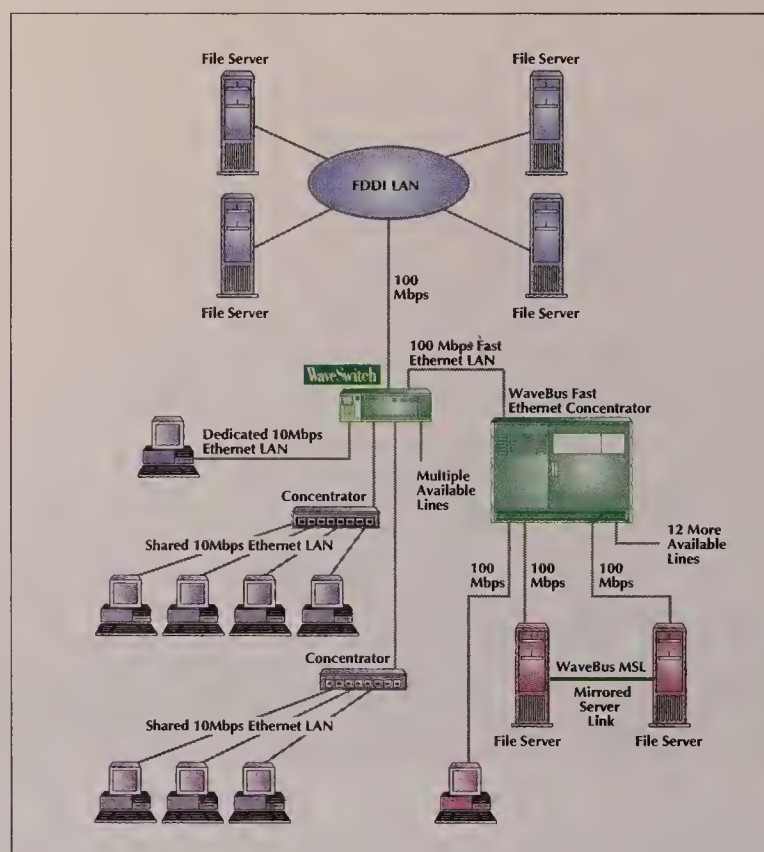


In today's network environment, overcoming slow Ethernet service can often be a challenge. Especially if you'd like to preserve your current network investments. Fortunately, there's an easy, economical solution for maximizing Ethernet bandwidth and simplifying overall LAN management: WaveSwitch, from Plaintree Systems.

## A new standard of switching performance.

WaveSwitch provides high-speed Ethernet switching with the operational simplicity of

bridging. Thanks to our unique, ASIC-based fast bridging technology, WaveSwitch offers both greater internal switch throughput and full 802.1d compliance. So you can filter or redirect particular addresses, protect your LAN against bad frames and fragments and perform spanning tree procedures while directing network traffic for maximum efficiency. All without changing existing Ethernet adapters and wiring. There's no easier way to ensure all your users the bandwidth they require.



PLAINTREE OFFERS PROVEN, COST-EFFECTIVE SOLUTIONS FOR MAXIMIZING LAN RESOURCES AND SIMPLIFYING OVERALL LAN MANAGEMENT.

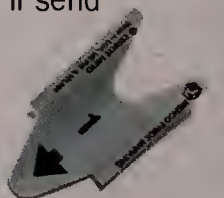
## The right connections for superior service.

WaveSwitch also provides a variety of flexible 100 Mbps connections. We offer links to FDDI and WaveBus — our own fast Ethernet — and, when standard, ATM and fast Ethernet. For maximum flexibility, we provide these links through modular cards, not hard code. As a result, you'll always be free to change connections easily and inexpensively as high-speed LAN technologies, and your organization's needs, evolve.

**Free  
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## "Improving Ethernet LAN Performance with Ethernet Switching."

To learn more about enhancing Ethernet network performance, call us toll-free today at **800-370-2724 ext 7158**. We'll send you a copy of our new white paper. There's no better way to begin building a network that will make all your users feel like they're number one.



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